Rock Products

With which is Incorporated **CEMENT and ENGINEERING NEWS**

Founded 1896

Chicago, April 25, 1931 | Issued Every Other Week | Volume XXXIV, No. 9

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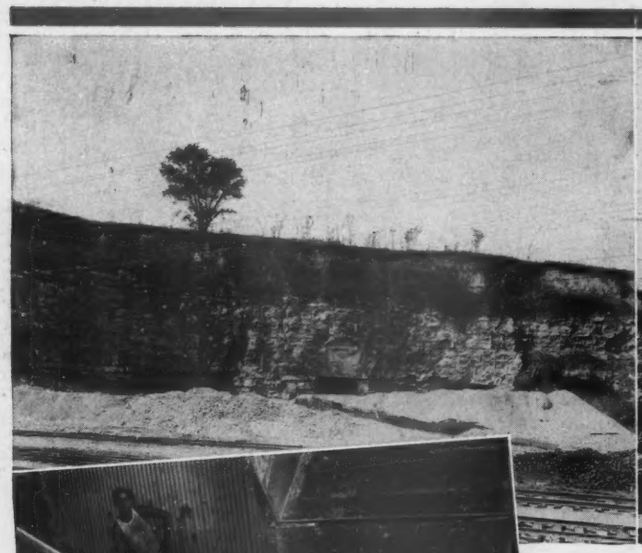
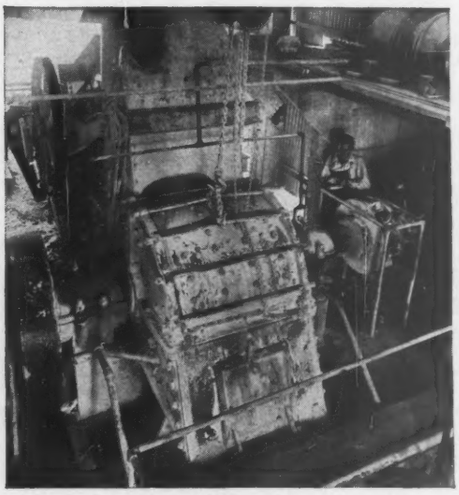


The Quarry

The Rock

Bussen Quarries

now crushing steam shovel size rock to 2" with ONE Crusher



The Crusher

If you have ever wondered why so many modern plants are installing Williams Hammer Crushers just study over the following. It tells what a Williams has done for Bussen Quarries, Inc., Jefferson Barracks, Mo.

One Williams replaced a primary breaker and recrusher which cost twice as much as the Williams.

Crushes 300% more material with the addition of only 25% more power.

Makes ¾" to 1¼" binder rock without a recrusher and produces fewer fines than previous crushers.

Product is cubular in shape with no slivers to bridge and form voids in concrete.

Handles larger rock, pieces weighing four times as much as that handled by previous primary breaker.

Requires less supervision, less oil and grease and bearing troubles are unknown.

Come and see this one run or let us send list of other users. A size for every job. Capacities 10 to 300 tons per hour.

Williams Patent Crusher & Pulverizer Co.
800 St. Louis Ave., St. Louis, Mo.

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PATENT CRUSHERS GRINDERS SHREDDERS

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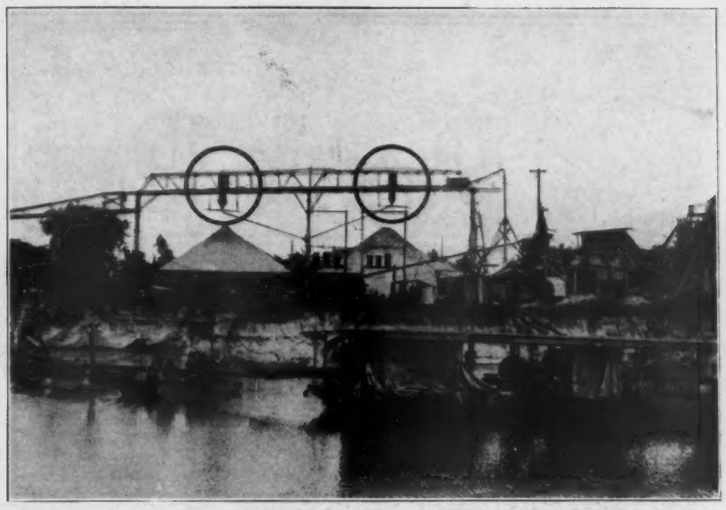
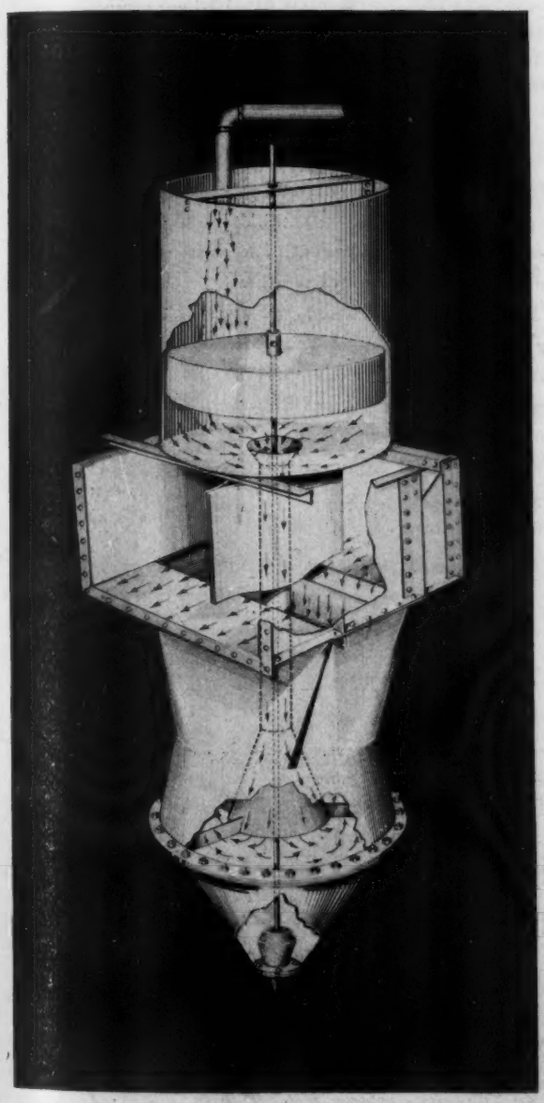


NO CAR REJECTS



with the SHAW CLASSIFIER

(PATENTED)

CONSTANT improvement in equipment and methods is a by-word of the management of the Ottumwa Sand Co. Considerable difficulty had been encountered in handling the fines of this river sand, which resulted in occasional car rejections, with delay, inconvenience and money loss.

In 1929 these two Shaw Classifiers were installed, and since that time not one car of sand has been rejected.

The Shaw Classifier produces the cleanest product, and gives the most accurate sizing of any form of separator made. It is the only one that will entirely prevent dirty water from getting into the product.

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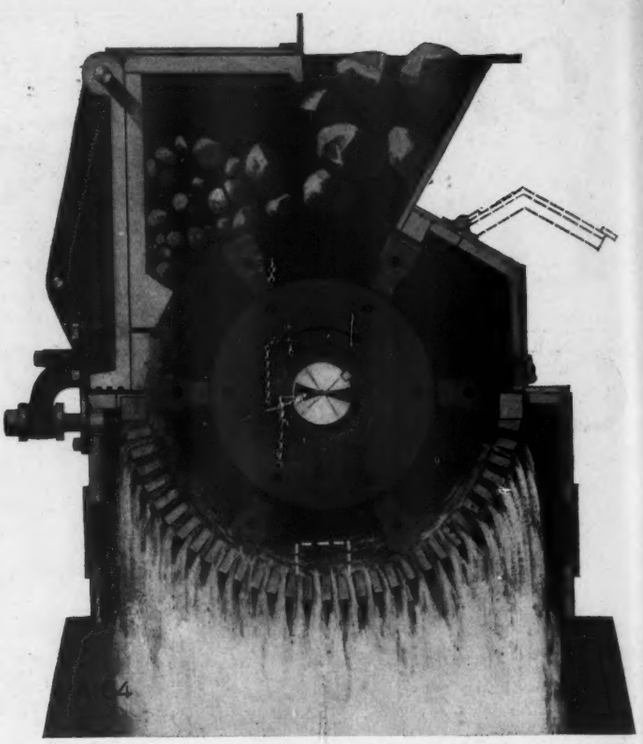

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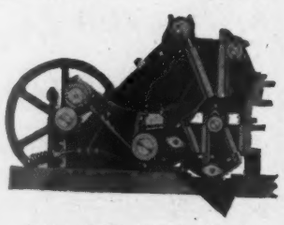

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Performs both primary and secondary crushing in one machine. Will reduce 6 to 12 inch rock to ½ inch in one operation. It will produce the same amount of 1 inch product as an ordinary crusher will of a 2 inch product. Write for Catalog No. 3-B.

For heavy, continuous duty specify a Jeffrey Type B Pulverizer—capacities up to 500 tons per hour—steam shovel size material reduced to 1½" and under in a single operation.

Catalog No. 450-A gives sizes, capacities and construction details. May we send you a copy now?

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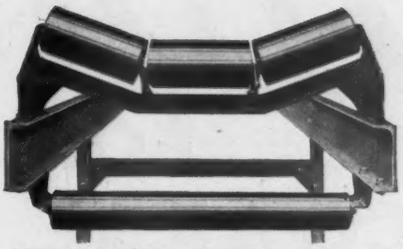
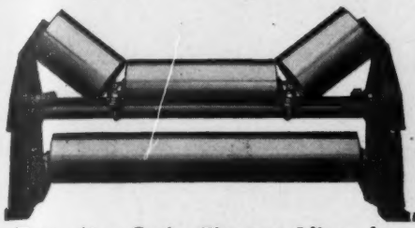
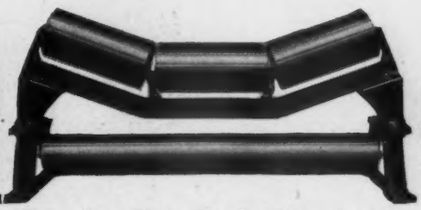


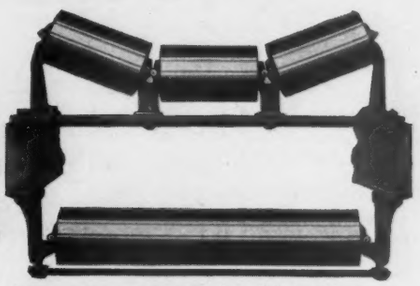
Type 40—For general use. Features are Timken Bearings, grease seals which protect bearings from dirt, and machined rolls. The standard of anti-friction idler construction.



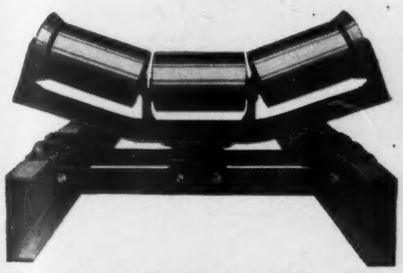
Type 48—Grain Elevator Idler, designed to meet the general dimension requirements of grain elevator service. Widely used to replace plain-bearing idlers as they wear out.



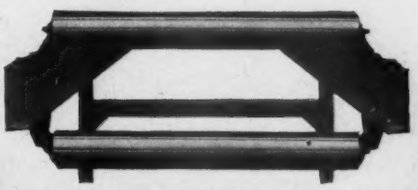
Type 42—Unit Stand Idler, for use where it is desired to have the entire conveyor above the floor or other supporting structure. Bearings and grease seals are the same as in Type 40.



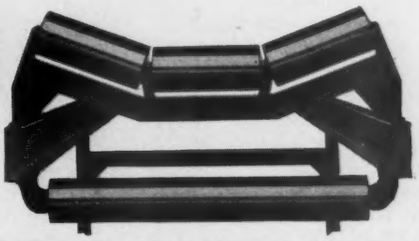
Type 52—Ball-Bearing Idler, intermediate between Timken-Bearing type and plain grease cup bearing type. For narrow belts. At lower cost than the Timken-Bearing equipped idlers.



Type 57—Self-Aligning Idler. This type maintains the training of the belt under unusual operating conditions, and materially lengthens life of belt. Used at relatively long intervals, between fixed idlers on belt conveyor run.

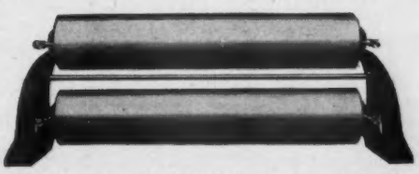


Type 44—Flat Roll Idler, for package conveyors, distributing conveyors, etc. Roll construction is same as that of the Link-Belt Anti-Friction Return Idler.

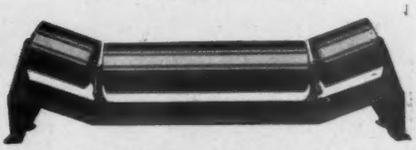


Type 49—Heavy Duty Anti-Friction Timken-Bearing type, used by mining industry, cement mills, rock crushing plants, or wherever large tonnages or heavy materials are handled.

Type 58—A Flat Roll Idler built for heavy duty service in foundries, machine shops, etc. Bearings and grease seals are the same as in Type 40. Requires minimum of maintenance.



Type 63—Flat Roll, Unit Stand, Ball Bearing Idler, at lower cost than Timken-equipped idlers. Gives dependable service. This type is suitable for narrower width flat belts.



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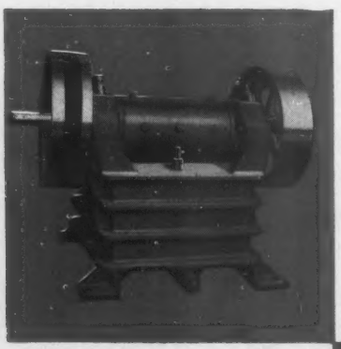
Again Telsmith engineers have perfected a crusher of outstanding value—a jaw crusher that effects a greater reduction in one process—a simple, robust machine, equipped throughout with anti-friction bearings, requiring less power, capable of a wide range of adjustment, making a remarkably uniform and cubical product.

In 1930, when the Smith Engineering Works purchased outright the crusher department of the Wheeling Mold & Foundry Co. . . . Wheeling anti-friction bearing, steel-built jaw crushers were widely used throughout the United States and Canada. A most careful survey . . . made prior to the Wheeling purchase . . . disclosed the excellent field record of the Wheeling Jaw Crusher. Telsmith engineers saw great merit in its simplicity, compact steel structure, easy adjustment and proven efficiency in fine reduction. But this investigation also revealed possibilities for improvement.



View of Telsmith-Wheeling Jaw Crusher showing adjustment screw and nuts for raising and lowering wedge-block to change discharge opening.

Telsmith engineers have made important changes in the bearings, adjusting mechanism, jaw clamping device and main structure. As now offered, the Telsmith-Wheeling Jaw Crusher still resembles its predecessor in external appearance; but in design and performance it is a far superior machine. Stronger, more efficient and most reliable . . . it possesses all the merit that the distinguished Telsmith name-plate implies.

TELSMITH
WHEELING
JAW CRUSHERS

WS-1

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Made in 4 sizes: 9" x 16"—9" x 21"—9" x 30"—9" x 36"

NEW TELSMITH FEATURES

Cylindrical Roller Bearings—Used in both swinging jaw and frame . . . proven more suitable for heavy crushing service than any other type. Equipped with special piston ring seals that keep lubricant in and dust out.

Easily Accessible—With cylindrical bearings, crusher is quickly dismantled and assembled in the field, even by inexperienced labor. Bearings require no adjustment.

Rigid Manganese Die Plates—Stationary and swinging jaw plates are manganese steel, accurately fitted, clamped tightly in place by wedge blocks.

Steel Frame—Main structure is annealed cast steel. Machined inside to provide permanently true surfaces for jaw dies, toggle and wedge blocks. Frame is bored (both sides at one setting), assuring true permanent alignment of shaft and anti-friction bearings.

Effective Crushing Stroke—Upper part of swinging jaw moves outward to crush coarse rock at top, then retreats . . . and lower part of jaw moves forward to finish crushing action at bottom. Three toggle settings provide for more efficient reduction at coarse or fine adjustment.

Easy, Rapid Adjustment—Can be made while crusher is running. Wide range of opening provided. Adjusting mechanism simplified and made more substantial.

V-Rope Drive—Drive pulley on all sizes can be furnished to provide for V-rope drive.

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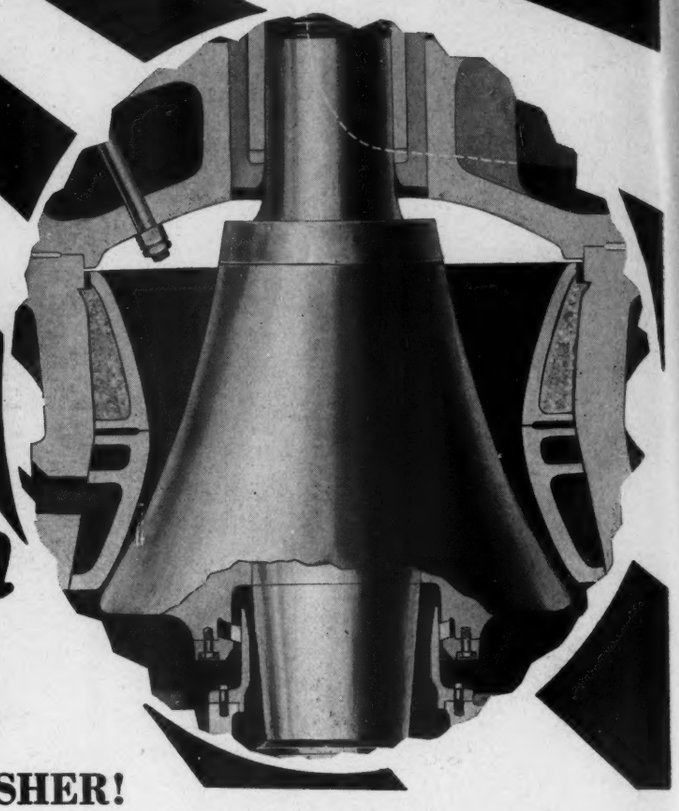

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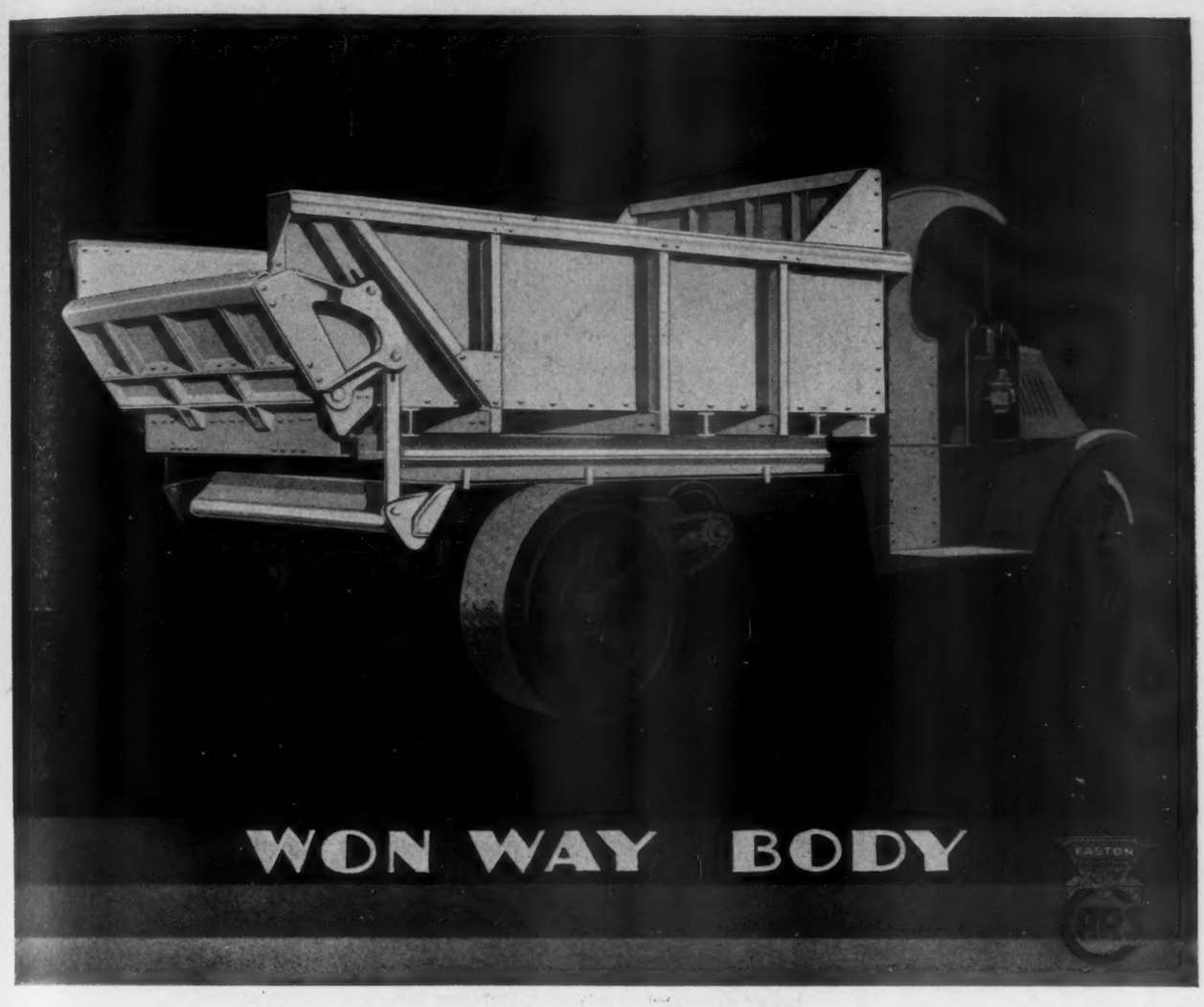

• *strength* in abundance, in excess of its ultimate requirements, fits the Won-Way Body for shovel and quarry abuse . . . its rigidity remains pronounced over years of constant use.

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• *stamina* in the Won-Way Body is most evident in the details of its design . . . its Herculean structure assures lasting endurance.

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WIRE ROPE must work harder than formerly. We have bigger, faster machines now. For the wire rope user the difference in today's jobs and those of ten or twenty years ago is largely a matter of equipment. But for the rope manufacturer that heavier, faster equipment means a tougher job.

Hazard has been making wire rope since 1846. That's a long time—a lot of experience. But because modern conditions demand a better rope—a rope that will wear longer, run straight, handle easier and faster—in short, meet the modern demand for *increased* service—Hazard now makes Lay-Set Preformed Wire Rope.

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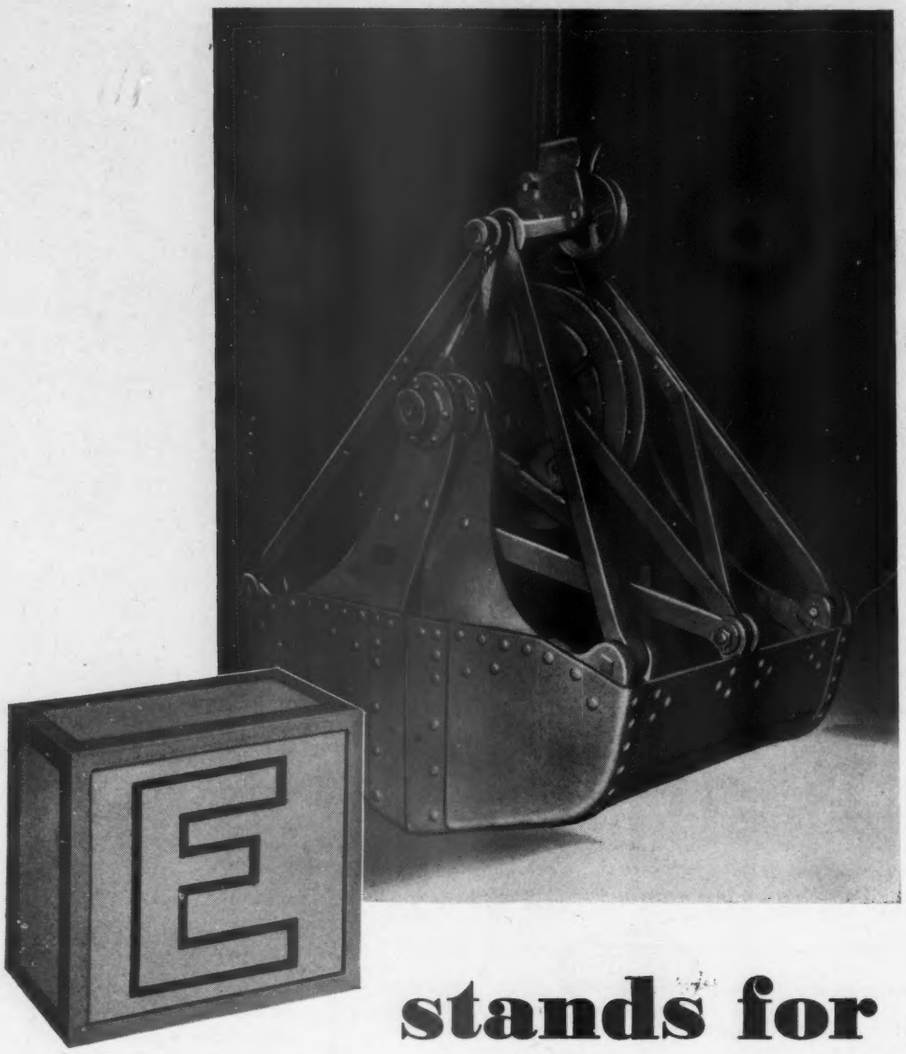

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E stands for . . .

EFFICIENT . . . because a Hayward Class "E" Clam Shell is an *Energetic* bucket with plenty of *Endurance* . . . a bucket that makes *Easy* work of *Emptying* cars or barges.

"E" also stands for the *Extra* features . . . which are the *Earmarks* of Class "E" . . . the power wheel with patented flat link closing chains which give the bucket great closing power . . . the special truss bracing of connecting rods and blade arms which insures correct bucket alignment and eliminates sidelash . . . the special shoe which protects the cutting edges, and other features of this Hayward.

Finally "E" stands for *Enthusiastic;* for that is the kind of praise a Hayward Class "E" Clam Shell always wins from the men who use it. Having four different types of digging and rehandling buckets to draw from, makes a Hayward recommendation absolutely unbiased.

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Hayward Buckets

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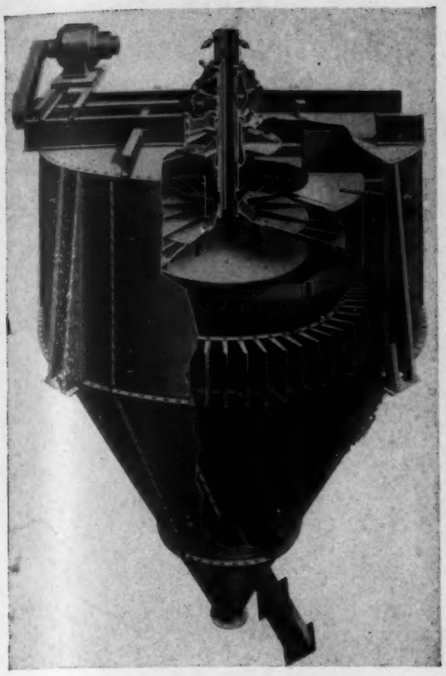

Constant Uniformity

—regardless of changes *in the rate of feed or fineness of grind*

CEMENT manufacturers are setting new records of performance with Raymond Mechanical Air Separators, as in the following installation—typical results, duplicated in plant after plant.

Two 14-foot Raymond Separators, installed in a cement plant, are used for classifying cement raw material to a finished product of 93% through 200-mesh screen. The feed to the Separators is first reduced by a ball mill to a fineness of 46% passing 200-mesh, while the tailings are re-ground in a tube mill to 76% through 200-mesh—averaging 61% material when fed together.

On carefully checked runs, using three different grades of fineness, these consistent figures were obtained:

Feeding 61% material—resultant product 93.0%
Feeding 46% material—resultant product 92.8%
Feeding 76% material—resultant product 93.0%

Note the uniform results, showing why cement producers favor Raymond Separators. The separator capacity was 26 tons an hour in the first case. A slightly *lower rate* of feed was tried, yielding a product of 92.9% through 200-mesh at 25 tons per hour. Finally, the rate of feed on the 61% material was varied from *5 to 100 tons per hour.* The fineness of the finished product did not change over 2/10 of one per cent.

The close uniformity maintained under all conditions, and the extra large volume of production, are advantages that go with Raymond Mechanical Air Separators. If you want *Raymond results*, specify *Raymond equipment.*

Write for your copy of the new RAYMOND BULLETIN "Mechanical Air Separators"

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Subsidiary of International Combustion Engineering Corporation
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If you could look under the surface and see your deposit exactly as it is in area, depth and contour, that would save you money in planning your operations. The nearest approach to this is through the rock cores recovered by diamond drilling—cores which show an actual cross-section of the rock in place. Information thus secured will afford a basis for efficiently planning your surface arrangement of washing plants, mills, tracks, stripping dumps and houses, all of which bear a direct relation to the physical characteristics, distribution and purposes of the deposits.

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It would be worth your while to let Longyear contractors diamond drill your properties. We have done a large amount of core drilling in the non-metallic field, and our equipment and trained crews are available for your job on a contract basis.

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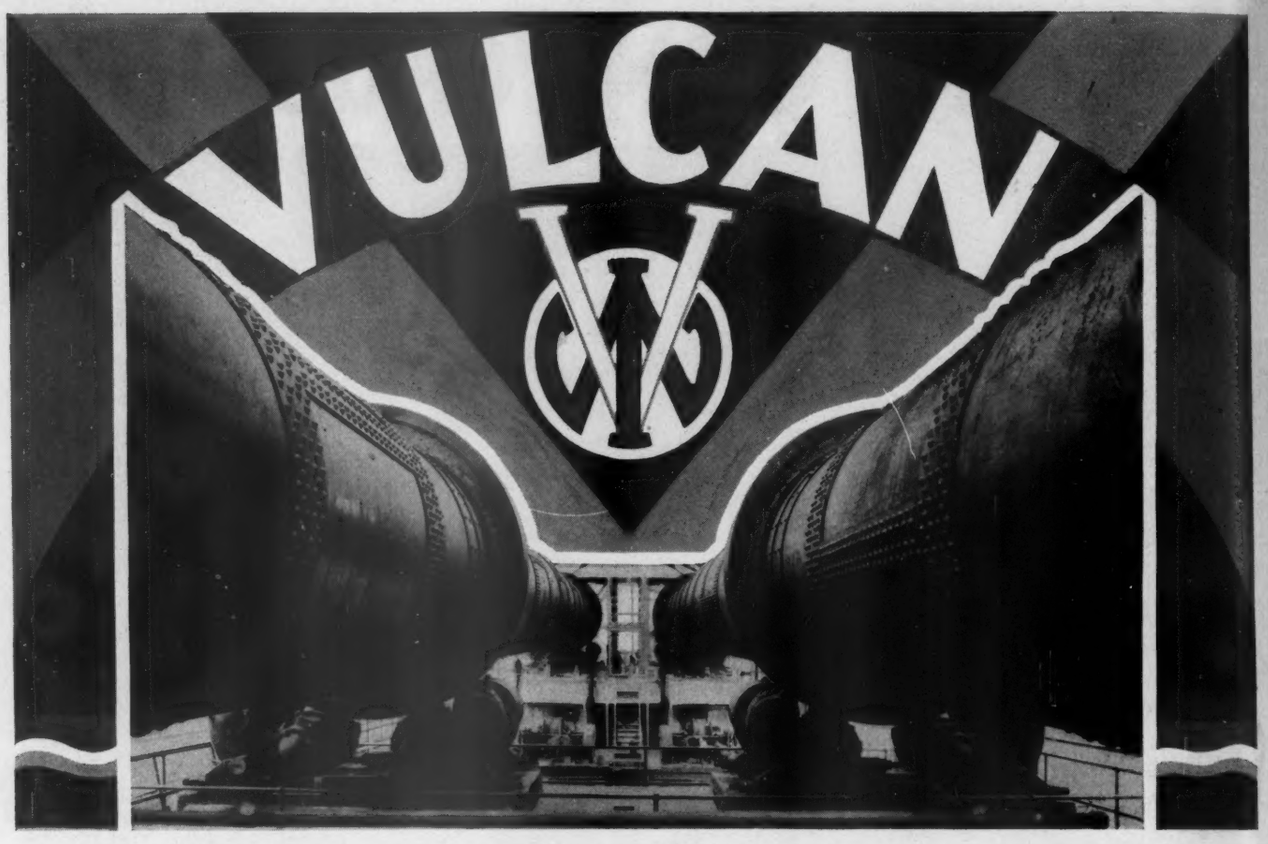

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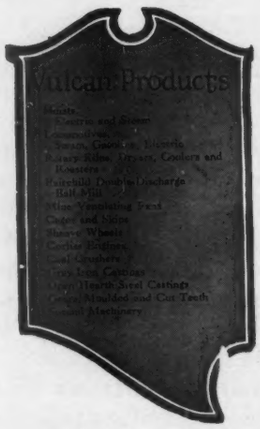
MANY prominent operators have shown a preference for VULCAN KILNS after a careful study of VULCAN performance records have convinced them of the superior results and economies effected by these dependable kilns.



30 years of experience have enabled VULCAN engineers to develop VULCAN KILNS to that state of perfection where the interests of the operator are safeguarded as to quality of material—production and cost of operation.

VULCAN KILNS are sturdily built to eliminate breakdowns, yet operate with surprising ease.

VULCAN engineers are always pleased to advise operators in the selection of equipment that will best serve their purpose. Your inquiry places you under no obligation. Send for free literature covering the entire line of VULCAN equipment.

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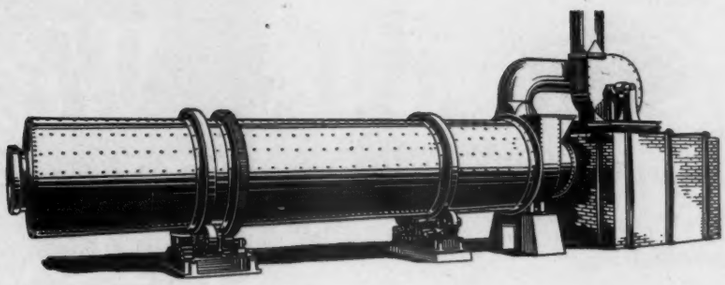

Drying Coal in a Cement Plant in Chile

"From the day they started the Ruggles-Coles Dryer, they have had absolutely no trouble with it."

This is an A-8 Ruggles-Coles Dryer in a cement plant in Chile.

The operator writes that they are much pleased with the results obtained from the dryer. It had been in continuous operation some seven or eight months when this letter was received.

Another operator in South America wrote us some time ago that his Ruggles-Coles Dryer was the only piece of equipment in his plant that operated perfectly from the start, and it has given no trouble since.

* * * *

10 types of Ruggles-Coles Dryers are built in from 4 to 8 sizes. These are modified to meet special conditions, or new types are designed if the necessity arises. Write for Catalog No. 16B.

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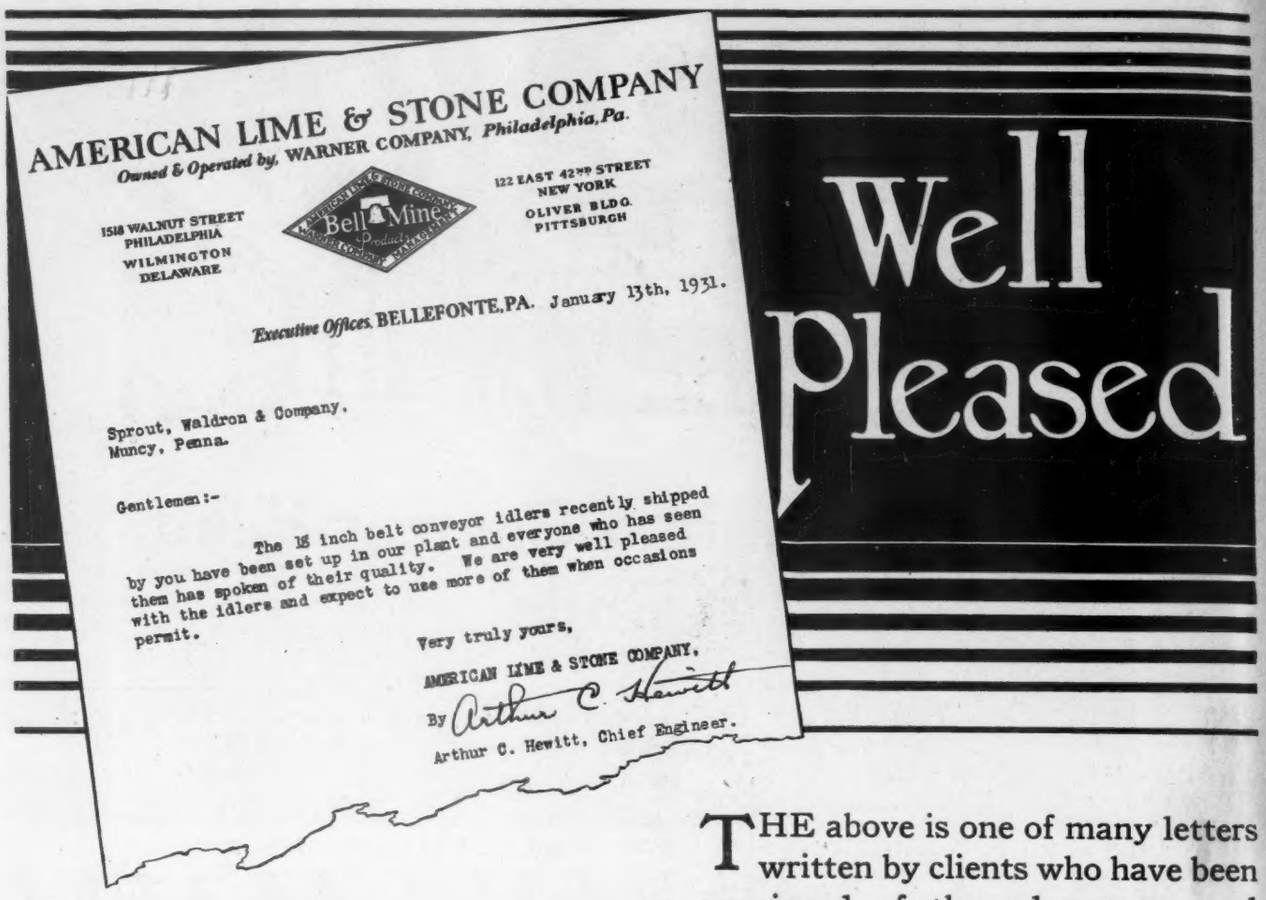

The Monarch line of material-handling equipment is very complete and includes: Idlers—Pulleys—Bucket Elevators—Screw Conveyors—Elevator Buckets—Bearings. Also special machinery.

THE above is one of many letters written by clients who have been convinced of the advantages and economy of the Monarch type No. 101 Timken-Equipped Idlers.

These idlers are made in types and sizes to meet the various requirements of material handling. Pulleys are equipped with high-pressure Alemite fittings, and the brackets are made of semi-steel and are ruggedly ribbed to stand severe shock. Pulley rolls are doubly sealed against dust and grease leakage.

Like all Sprout-Waldron material-handling equipment, Monarch Idlers are designed for long, trouble-proof service. Send for literature describing our entire line.

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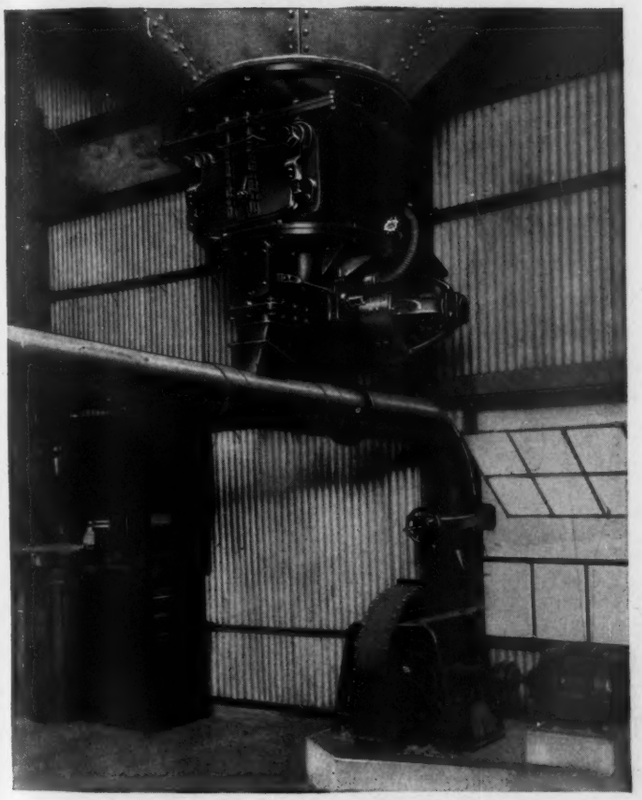
SAVES
5 and 8 Lb. of Coal per Bbl. of Clinker
with BAILEY FEEDERS



A Bailey Pulverized-Coal Feeder installed for feeding pulverized-coal to a rotary kiln in a cement plant.

SAVINGS of 5 and 8 pounds of coal per barrel of clinker have been obtained with Bailey Pulverized-Coal Feeders. The saving in fuel is the result of a steady feed of uniformly aerated coal to the kiln, whereby, combustion is always under control.

Bailey Feeders operate on a principle that precludes any possibility of flooding and fluctuation in the rate of feed. The feeder wheel, for every revolution, delivers a measured amount of coal; and when calibrated, the feeder can be used as a meter of high accuracy—within two per cent. Thus the operator can check the performance of each kiln and determine the quantity of coal consumed per barrel of clinker.

Now is the time to investigate the advantages of Bailey Feeders in connection with your plant betterment program. May we send you a copy of an article describing Uniform Feeding Requirements in Cement Plants and the important part which Bailey Feeders play in this service?

FULLER LEHIGH COMPANY
A Babcock & Wilcox Organization
85 LIBERTY ST., NEW YORK, N.Y.

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PULVERIZED-COAL EQUIPMENT—WATER-COOLED FURNACE WALLS—ELVERITE CASTINGS

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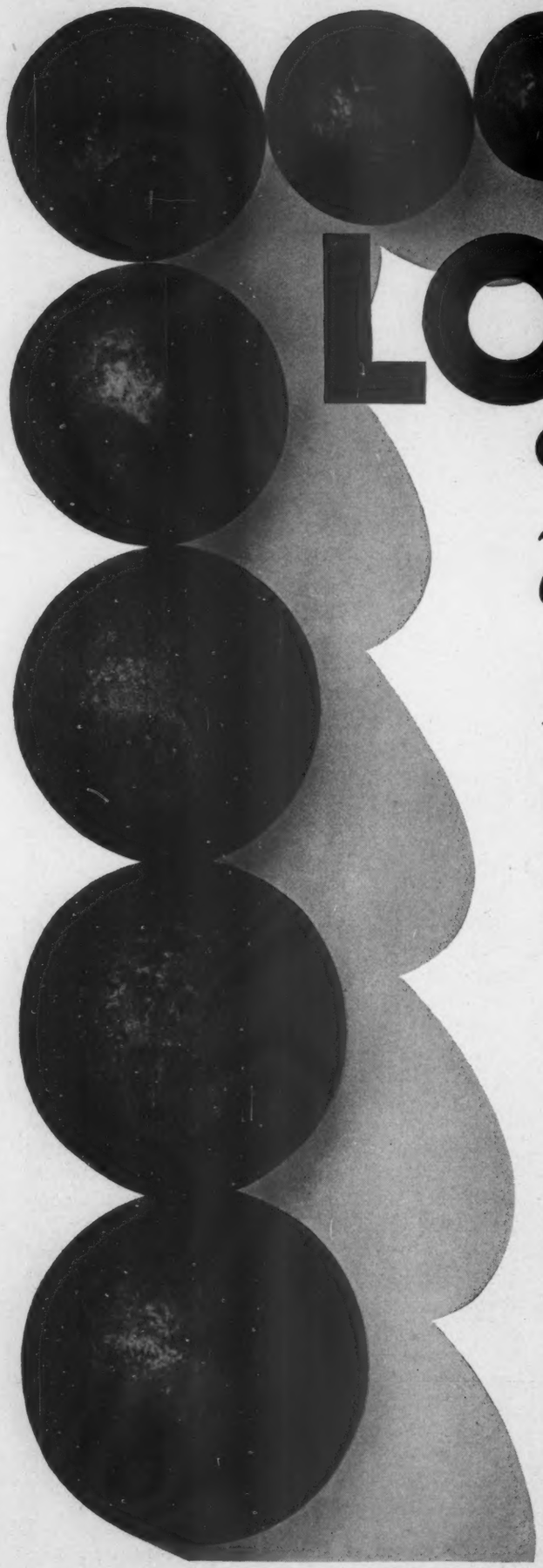

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GRINDING BALLS
—for Closer Control of Grinding Costs and Results

LORAIN GRINDING BALLS are correctly made, from high carbon steel of definite analysis, by a process of forging and heat-treating which insures uniformity in diameters and physical properties. Because they are correctly made, they yield lower costs. By standardizing on Lorain Forged-Steel Heat-Treated Balls you will have unvarying performance—satisfactory, scientific grinding operations. Let us quote on your requirements. Very prompt shipments can be made.

Balls for cement and ore grinding carried in stock at Johnstown, Pa., ready for quick carload shipments, and at Denver, Colo. for less-carload requirements. They can be furnished in the following sizes: ¾", ⅞", 1", 1¼", 1½", 1¾", 2", 2½", 3", 3½", 4", 4½", 5".

Other Lorain products, for which your inquiries and patronage will be appreciated, include: Mill Liners and Screens of manganese, chrome nickel, and plain carbon steel, or of hard iron; Hammers for Swing Hammer Mills; Industrial Cars, and all kinds of Trackwork.

The Lorain Steel Company

General Offices: 545 Central Ave., Johnstown, Pa.

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NOW-

Punched Manganese Plate!

TISCO TIMANG SCREEN CLOTH

TIMANG Manganese Steel Screen Cloth is available in any mesh or clear opening and any wire size from .148" dia. to 1" dia. For special purposes TIMANG wire as small as .003" dia. can be furnished.

PRODUCERS of aggregate are familiar with the long service and outstanding economy of manganese steel screen cloth.

Now, for the first time, punched manganese plate is also available for screening operations; in thicknesses from ½" down to 16 gauge, and in any size and pitch of perforation.

This improved screen plate is made from Tisco TIMANG, the 14% manganese steel which cold works readily, yet possesses the same wear-resistance as the cast manganese steel so extensively used for the wearing parts of your heavy duty equipment.

It will pay you to try this improved TIMANG punched manganese plate for your next requirement. In every installation to date, it has appreciably lowered screening costs by far outlasting ordinary plate.

TAYLOR-WHARTON IRON AND STEEL CO.

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the savings you can make in your hauling with a HEISLER

First you get a ***guaranteed increase*** of at least 30% in in Hauling Capacity, when this modern locomotive is put on your work. And besides—

You operate with a fuel saving of 25% to 30%, per ton-mile because of the better combustion and more efficient piston speed of the HEISLER.

You make another important saving— track expense. The HEISLER'S free-swiveling trucks have a flexible action that is easier on rail and road bed, as cost records show very plainly.

The HEISLER has other improvements, too, which mean more efficient hauling at lower cost.

We'll be glad to help you estimate the savings that a HEISLER will make on your work.

Write us for Catalog "R"

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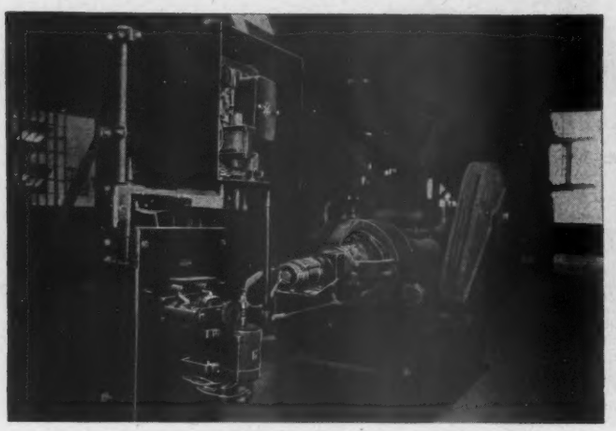
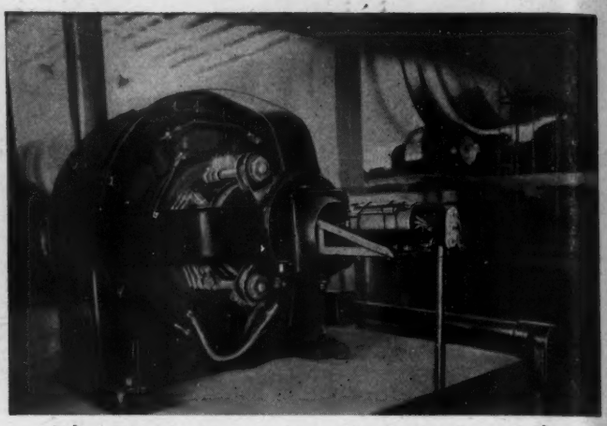
SELSYN-ACTUATED SPEED SYNCHRONIZATION



G-E Selsyn-actuated control apparatus for holding the ferris-wheel slurry feed in synchronism with kiln drive in picture at right made in plant of Keystone Portland Cement Co., Bath, Pa.



G-E 60-hp. d-c. motor driving kiln, Keystone Portland Cement Co., Bath, Pa. The direct-connected Selsyn generator serves to hold the speed of the feeder (in photograph at left) in synchronism with the kiln speed

FOR any installation where there is an advantage in synchronizing two or more drives—such as a machine with its feeder or a number of conveyors, or motor drives in general—General Electric recommends this new method of Selsyn-actuated speed synchronization.

For example, in cement plants this new control system maintains the feed of raw materials in proportion to the speed of the kiln, while permitting this speed to be adjusted over a wide range. This constant proportioning is considered by many cement burners to be essential to the production of high-quality clinker. The kiln attendant need only adjust the speed of the kiln drive; changes in kiln speed are reflected by proportional changes in the speed of the feeding mechanism. Also, predetermined proportional speed relations between two or more mechanisms driven by adjustable-speed motors of widely differing speeds can be easily maintained.

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Twenty-five ton capacity steam locomotive cranes cleaning track ballast.

LEAVING the crowded seaboard cities behind, the Pennsylvania Flyers take you speedily across the plains and through the beautiful wooded valleys of the Appalachians. These luxuries and punctual schedules of modern travel did not just happen. They are the visible evidence of scores of perfectly co-ordinated units, in which we take pride that Industrial Brownhoist locomotive cranes have had a part for nearly forty years.

Cleaning track ballast, coaling locomotives, laying rails, clearing track obstructions and doing the heavy handling on many kinds of construction work—these are only a few of the many jobs for which the Pennsylvania Railroad uses Industrial Brownhoist cranes. Two hundred and thirty-seven locomotive and crawler cranes make up this one road's fleet and the cranes are of many different types, ranging from 7½ to 150 tons capacity.

Industry today demands machinery which will show a substantial profit. In railroad service or your own, if you have materials to handle, an Industrial Brownhoist crane will quickly pay for itself. Our long experience has enabled us to help thousands of companies reduce their material handling costs. May we be of similar service to you?

Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco, Cleveland.
Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

INDUSTRIAL BROWNHOIST

BLAW-KNOX LIME PLANT SERVICE IS COMPLETE

It includes---

1. The design and manufacture of standard shaft kilns from a small installation to a modern gas-fired lime burning plant. There is no enterprise too small or too large to be efficiently and economically serviced.

2. Design and manufacture of Hydrating equipment including the Clyde Hydrator which is now producing 90% of the hydrated lime manufactured in the United States and Canada; Acme continuous hydrators; cooler separators; Blaw-Knox (Kuntz) system of hydrate lime separation; Blaw-Knox (Kuntz) system of dust control; Blaw-Knox (Kuntz) patented beater mills; complete buildings and accessories; in other words, complete plants ready for production.

3. Plans whereby existing plants can place themselves on a solid basis of profitable operation.

4. Engineering advice and service about everything and anything pertaining to lime burning and hydration: This advice coming authoritatively from an organization whose experience has been drawn from intimate personal contact with the best practices both at home and abroad.

Plants designed by the Blaw-Knox Lime Plants Organization are producing products of maximum quality at a minimum cost per ton with small outlay for capital expenditure. There is no direct or implied obligation when you ask Blaw-Knox to advise you.

Send your Lime Plant Problems to Blaw-Knox.

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THE ERIE "PEERLESS"

Built to a high standard without a parallel in bucket construction

The higher class of workmanship is evident. Extra strength and rigidity.

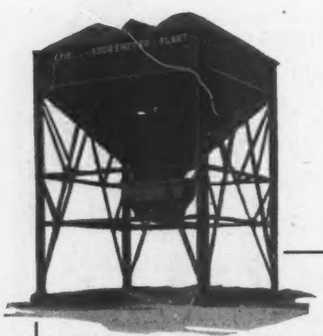
Maximum digging power is provided by the lever and block-and-tackle principle, with both closing sheaves on the end of the power arm. No side leads of cable.

A powerful and speedy general-purpose bucket

The ERIE "Peerless" covers a wide range of service.

For ordinary digging or rehandling the bucket may be reeved with three parts of line, giving fast closing and dumping. Reeved with four parts of line it easily digs bank sand or gravel, earth or clay, etc.

Our new bulletin "P-1" gives description of this speedy bucket; write for it.



The AggreMeter Plant to exactly suit your work—

The complete ERIE line of AggreMeter Plants includes the type and size plant you want— from small portable plants to complete central mixing plants of any capacity— 2-compartment or 3-compartment bins. Write for photos and specifications of the type and size you are interested in.

ERIE AGGREMETER PLANTS

318

ERIE STEEL CONSTRUCTION COMPANY
620 Geist Road, Erie, Pa.

THE ONE COMPLETE LINE FOR EVERY NEED

ERIE BUCKETS

The "Peerless" is one of eight types of ERIE Buckets, the *complete* line, all noted for high efficiency and quality construction. Tell us your requirements, and we will recommend the bucket best suited to your work.

RACKS and PINIONS

RACKS and PINIONS

Illustrating a set of AMSCO Shipper Shaft Pinions in use on one of the steam shovels of an Ohio Limestone Company. The Superintendent says: "We equipped the first shovel with these pinions in March 1929 and the shovel worked two ten-hour shifts per day until Nov. 1—and has been working since then on single shift. The average life of other pinions has been only five or six months! Needless to say we are equipping all of our shovels with AMSCO Pinions."

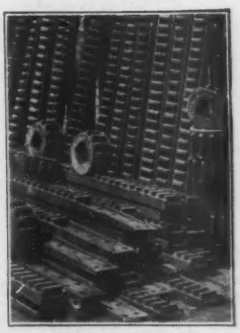
NOW— An Ideal Application for Manganese Steel—

TEETH in racks and pinions best withstand the severe service to which they're subjected when cast from AMSCO Manganese Steel. No other alloy cast steel has so marked a tendency for self-hardening of the working faces in service. AMSCO Racks and Pinions are laying down records of dependability in severe shovel service that are leading to their universal adoption.

AMSCO Manganese Steel is well suited and economical for cast parts in equipment subject to shock, breakage stresses or wear. Its use will return dividends on the investment in longer life, maintenance reduction and relief from the worries of repair and breakdown.

AMSCO Manganese Steel possesses a distinctive toughness, in addition to a high tensile strength, that withstands the most severe shocks and stresses. This toughness resists wear and breakage better than any other commercially available alloy cast steel.

Perfected shrinkage control in making the racks gives the accuracy demanded in these AMSCO parts. Hole centers and pitch are preserved within close tolerances. The recognized uniformity in quality and soundness of AMSCO Manganese Steel Castings is turned to extreme advantage in their adaptation to this service.



AMERICAN MANGANESE STEEL COMPANY, 377 EAST 14th STREET, CHICAGO HEIGHTS, ILLINOIS

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BY ITS OWN earnings, the Oliver United Slurry Filter has returned its investment cost within the first year. Beginning with the second year, these earnings—thousands of dollars annually—were applied to cost-reduction.

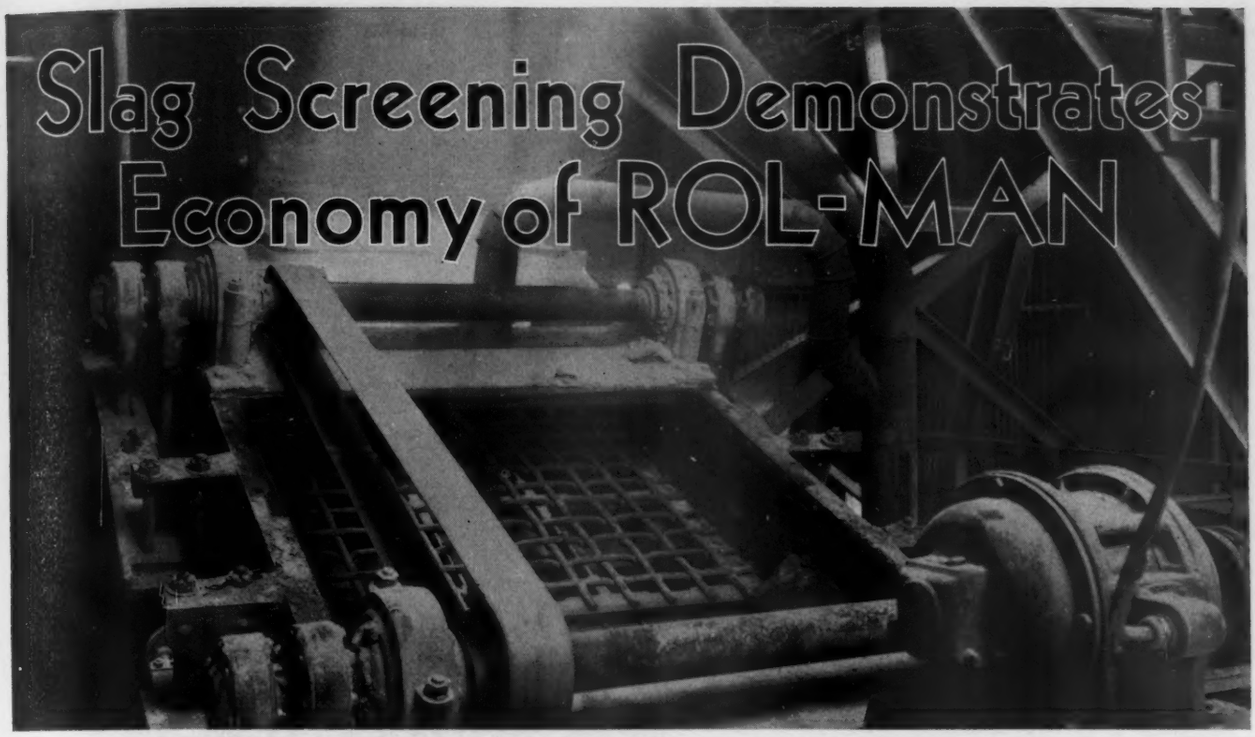
These earnings are easily determined. There's a sharp reduction (25% to 40%) in the fuel requirements, the saving between the "before and after" fuel requirements being brought about by the filter.

Kiln production can be stepped up 25% or more which means that all the operating and overhead cost on the kiln is chargeable against larger output, reducing the unit cost.

There is a clear-cut reduction in kiln maintenance and draft costs owing to the better feed and the reduced draft load.

Your business is entitled to the revenue the Oliver United Slurry Filter will provide. Its earnings, measured by thousands of dollars, cannot wisely be ignored.

Slag Screening Demonstrates Economy of ROL-MAN



DUQUESNE SLAG PRODUCTS CO.

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806 DIAMOND BANK BUILDING

PITTSBURGH, PA.

PITTSBURGH, PA.

March 18, 1931.

Mr. J. H. McKinley,
Manager, Pittsburgh Office,
Manganese Steel Forge Company,
Clark Building,
Pittsburgh, Pa.

Dear Sir:

The accompanying photograph shows a 4'x 10' Pittsburgh vibrating screen located at the discharge end of the main elevator in our Pittsburgh plant at 4116 Second Ave.

It is a single-deck screen that is used to scalp off material that will not pass a 3½-inch round opening, and is equipped with ROL-MAN double-lock mesh woven manganese-steel screen cloth made of ¾-inch rods with 3¼-inch square clear openings.

This screen cloth was placed on the vibrator Aug. 20, 1930, and is still in use, having handled up to Mar. 15 over 100,000 tons of crushed slag passing the 3¼-inch mesh.

Previous screens of ordinary steel did not last longer than 6 to 8 weeks, handling not over one-third the above tonnage.

We are much pleased with the screening capacity and the long life of these ROL-MAN Manganese-Steel Screens.

Yours very truly,
DUQUESNE SLAG PRODUCTS CO.
C C Burgess
Operating Manager.

CCB/jc
Pgh.

As indicated by this letter, extensive use in the various plants of the Duquesne Slag Products Co. is demonstrating the efficiency and economy of ROL-MAN Screens.

It will be noted from the illustration that there is very little sign of wear on the screen cloth, although it had handled over 100,000 tons of crushed slag when the picture of the Pittsburgh Vibrator was taken.

This is due to the fact that ROL-MAN Screens are made of a true manganese steel which has the greatest resistance to wear of any steel made. In addition, the patented double-lock mesh weave insures accuracy of grading throughout the life of the screen.

You, too, can make savings by specifying ROL-MAN for new or existing machines. Write for Bulletin No. 120.

The Pittsburgh Coal Washer Co., as well as other manufacturers of screening equipment, will supply ROL-MAN, if specified, on new machines, or will supply it for replacements on existing machines. Ask for ROL-MAN by name to be sure of obtaining the high efficiency and long life for which these true manganese-steel screens are noted.

and *PRESTO!* —*it spouts a rod of fiery red*

You are in the great Morgan Rod Mill of the Roebling plant. Only a handful of men are present. Yet, here is a veritable bee-hive of activity—and before your eyes is performed a feat of modern industrial magic.

Here, with almost unbelievable swiftness, machines of super-human skill and accuracy transform billets of steel into glowing coils of snake-like rod. Two inches by two and 28 feet long, a square billet is fed into the furnace at one end of the mill—and presto! it is spouted out at the other end, a round rod about 700 feet long and in any desired diameter from .200″ to .360″.

In making Roebling "Blue Center" Wire Rope the most modern of production facilities are employed in every process. To insure the exceptional quality and uniformity for which it is noted, no stone has been left unturned.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*

WIRE • WIRE ROPE • WELDING WIRE • FLAT WIRE • COPPER AND INSULATED WIRES AND CABLES • WIRE CLOTH AND WIRE NETTING

ROEBLING "BLUE CENTER" STEEL **WIRE ROPE**

Diagram shows how Clintonizing expels air entrained by mixing.

THE Clinton Process delays initial setting of central-mix concrete, prevents segregation, and definitely increases strength. It makes the product saleable to a wider market at a better price. And it does this at a *lower* cost for haulage and delivery. The process and its results are fully described in this catalog.

A Clean Discharge in One Minute

THAT is all the time needed to discharge even the stiffest mixture—and discharge it clean—when the new Clinton Conveyor-Conditioner, Type 2, is used.

Absence of blades in the Clinton tank is the reason; they are not necessary when central-mix concrete is agitated the Clinton way. With no blades, there is a slight scouring action as the tank revolves, which keeps the walls clean and eliminates the need of hoes and shovels to get the concrete out of the tank.

Absence of blades brings other benefits, too. Power required to agitate is reduced one-half. Setting is slower, and the hauling range therefore greater. Mechanical strain and wear are less, and life of equipment largely increased. Risk of breakage is nil. Figuring depreciation and repairs, the delivered cost of the concrete is the lowest possible.

Add the large savings in labor and truck time (due to quick discharge) to the savings in power and in wear and tear, and the economies of Clinton haulage are too important for any central-mix operator to overlook.

CLINTON MOTORS CORPORATION

Noble & Grace Sts. Reading, Pa.

"CLINTONIZING"
(PROCESS PATENT APPLIED FOR)

The Final Touch to Ready-Mixed Concrete

A Drill for *every* rock drill user

Pneumatic Feed Drifter, wet or dry. *For light to medium duty line drilling, broaching and yard drilling in dimension stone quarries. Five sizes. Bulletin W1204-S1.*

Screw Feed Drifter, wet or dry. *For light and medium duty. Light in weight, easy to handle. Four sizes. Bulletin W1202-S1.*

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Pneumatic Feed Drifter, wet or dry. *For light line drilling and broaching in dimension stone quarries. Bulletin W1204-S1.*

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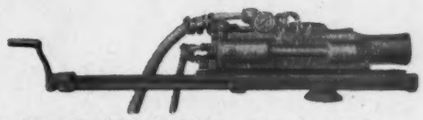

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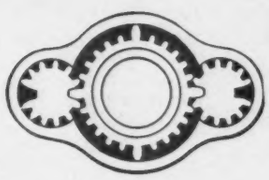

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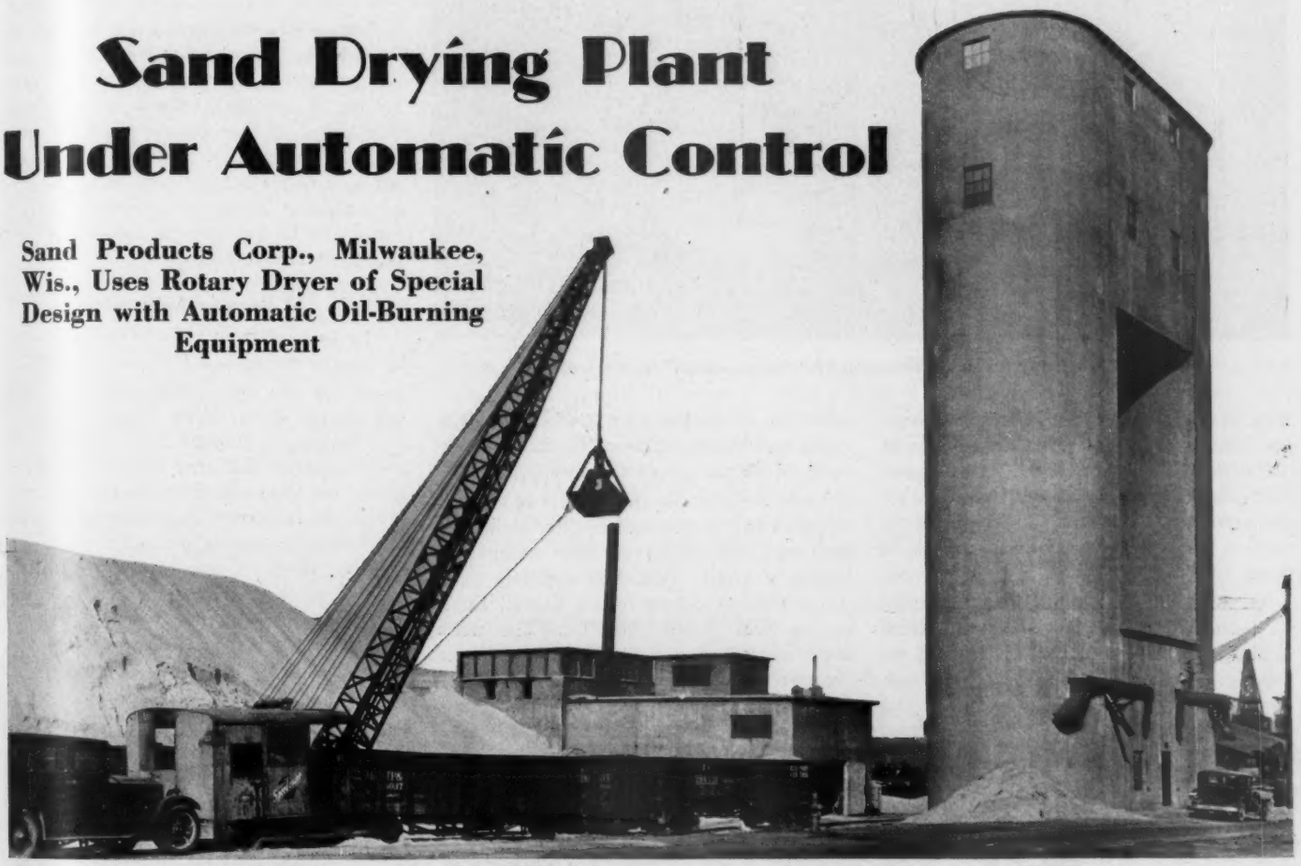
Volume XXXIV Chicago, April 25, 1931 Number 9

Sand Drying Plant Under Automatic Control

Sand Products Corp., Milwaukee, Wis., Uses Rotary Dryer of Special Design with Automatic Oil-Burning Equipment



From stock piles on the unloading dock, the sand passes through dryer building to storage silos

WHAT IS UNDERSTOOD to be the only installation of the kind in this field is being used at Milwaukee, Wis., by the Sand Products Corp. for the drying of molding sand used in gray-iron foundries.

It is unique and interesting in that it is economical and about as nearly automatic as such an operation can be. To all appearances its use might profitably be extended to other fields such as the drying of stone, cement-making materials, etc. The installation consists essentially of a rotary dryer of special design and construction and with an inside tube, which is heated by means of oil-burning equipment provided with automatic control and in connection with a special combustion chamber. The plant is located for both water and rail shipments so that the raw material may be brought in by boat, and the dried material shipped out by rail or truck.

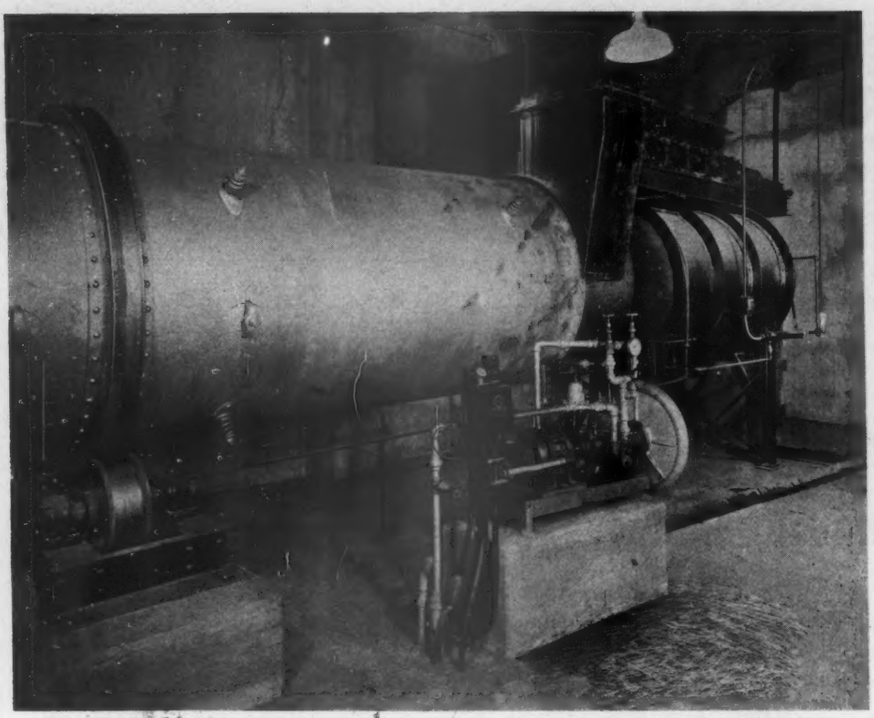
The raw sand is brought in from Michigan points across the lake during the navigating season in self-unloading boats, which discharge their cargoes of 6000 to 8000 tons on to a 75,000-yd. storage dock.

Open Hopper Feeds Dryer

From this open storage pile the sand is handled to the drying plant by a gasoline-engine-driven crawler type "Speedcrane" with a 60-ft. boom and a ¼-yd. clamshell bucket, which keeps filled an open steel hopper of 300 tons capacity extending through the roof of the drying plant.

Under the hopper a Stephens-Adamson belt conveyor (23 in. wide by 8 ft. centers) driven by a 3-hp. General Electric motor regulates the feed of the raw sand, which is spouted from the conveyor to the shell of the rotary dryer. The dryer is 5 ft. in diameter by 40 ft. long, of the usual shell construction, revolving on tires and rollers, and with a slope of ½ in. per ft., but with a 26-in. diameter inside tube extending the length of the shell and held in place by rods and coiled springs. It is driven by a 30-hp. General Electric motor through a Jones gear reducer.

At the feed end of the dryer and in line with it is a brick-lined steel combustion chamber of special design in which the oil is burned. The hot gases from this chamber travel down through the inner tube to the discharge end of the dryer, and are there turned back by a curved end-bell casting on the end of the inner tube, so that they re-



Feed end of dryer, with combustion chamber and automatic control

turn through the space between the inner and outer shells to the stack at the feed end. Thus the drying action of the high temperature gases is indirect and carried on through the inner tube, while the action of the returning gases at lower temperatures is direct.

A considerable part of the sand is carried around and dried on this inner tube, which is arranged with flights or fins to hold the material in contact with it.

Screen Section at Discharge End of Dryer

At the discharge end an 8-mesh screen attached to the end of the shell removes any coarse impurities and the finished dried sand falls through a spout to an 18-in. by 36-ft. S.-A. belt conveyor below. This conveyor, in a concrete tunnel, passes under one of the railroad tracks and across to the loading silos adjoining the dryer building, where it discharges to a steel-cased 10-in. S.-A. belt-bucket elevator 105 ft. long carrying up to the top of the silos.

From the elevator the sand is spouted to either of two 22-ft. concrete silos, each holding about 1000 tons, and from which it is loaded through spouts to railroad cars. These silos were built by the Burrell Engineering and Construction Co. The walls were carried up as shown in one of the pictures to house the top of the elevator.

The elevator and conveyor equipment was furnished by the Stephens-Adamson Manufacturing Co. The 18-in. belt conveyor in the tunnel is driven at the head end by a 3-hp. General Electric motor through a Jones worm gear reducer, while the elevator is driven in like manner by a 10-hp. G.-E. motor and Jones heavy-duty worm reducer. A special heat-treated rubber belt furnished by the U. S. Rubber Co. is used on the belt conveyor.

Editor's Note

HERE is described an automatically controlled system of sand drying that has a broad application in the rock products industry. It can be applied to dryers for stone, gypsum, cement raw materials, etc. Possibly it is the opening wedge for automatic control of rotary kilns. At least it makes instrumental control of lime, cement and gypsum operations look nearer than ever before.

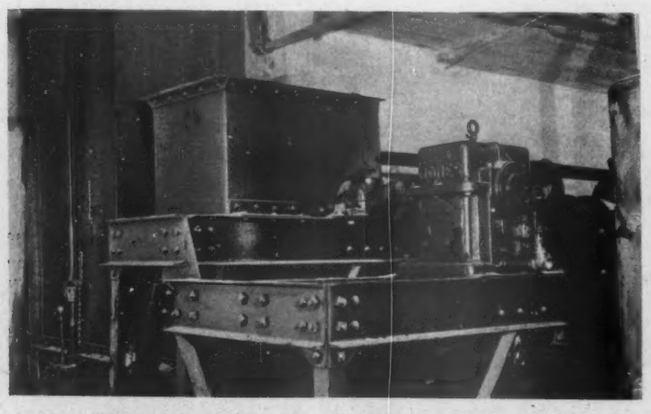
Part of the enclosed space between the two silos has been used to house a large fuel oil storage tank, this protected location helping to keep the oil warm and more fluid. Fuel oil of 16 deg. Baumé gravity is used, which is received in tank cars by rail and put up into the storage tank by means of a rotary pump driven by a 5-hp. motor. A car of 12,000 gal. can be unloaded in this way in about 3½ hours.

Oil Burning Equipment

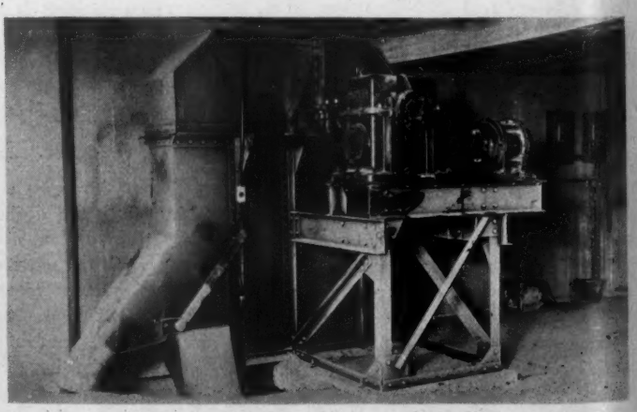
The fuel oil from the storage tank flows by gravity through a pipe line to a rotary pump and fan unit located near the firing end of the dryer, being heated along the way by passing through coils placed in the hopper at the discharge end of the dryer, where the dry sand falls to the belt conveyor. It is further heated between pump and burner by passing through a copper coil of three turns of pipe around the outside of the combustion chamber at the end toward the dryer. For starting and for emergency heating, an electric heating unit is included in the oil line at this point.

The pump and fan unit, a "Petro" No. 4 set, consists of a small rotary pump driven through a speed reducer, and a small blower delivering air at about 12-oz. pressure, both driven by a direct-connected 3-hp. General Electric motor, arranged for automatic control.

From the pump the oil goes to the burner, a Petro No. 2A turbine type burner, which is attached to the end of the patented combustion chamber previously referred to.



Belt conveyor drive and discharge to elevator



Elevator drive and discharge to storage silos

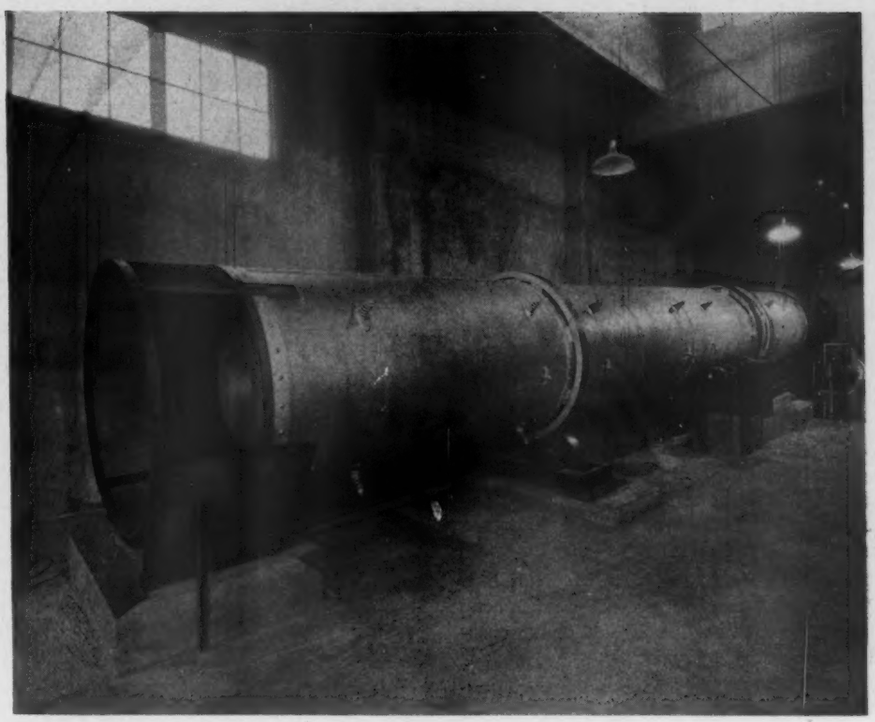
Both burner and pump unit were furnished by the Petroleum Heat and Power Co., New York City. This burner has but one moving part, an air-driven atomizing cup, which is supported on a double set of ball bearings and is rotated at high speed by a stream of low pressure air supplied by the small blower of the pumping set. The fuel oil is fed through a tube and flies off the serrated edge of the rotating cup in a finely atomized condition. The air which has rotated the cup passes on through a set of deflecting vanes, which cause it to whirl in a direction opposite to the oil spray, thus creating a turbulence which helps to thoroughly mix the oil and air and keeps it away from the furnace walls.

This primary air used in spinning the cup and atomizing the oil is only about 7% of the total amount required for complete combustion, the rest being forced in through an adjustable shutter and supplied by a No. 3½ "Sirocco" fan having a capacity of 5300 cu. ft. of air per minute at 1-in. pressure. This fan is driven by a 3-hp. General Electric motor through a Texrope drive.

An oil pressure of about 19 lb. per sq. in. is used, and the temperature of the oil going to the burner is held at about 120 deg. F. during the summer and 200 deg. F. during the winter. Practically complete combustion is indicated by the absence of any smoke.

Automatic Control

The automatic feature consists in using thermostatic control to regulate the quantity of oil burned (high or low fire), depending upon the amount of moisture to be driven off, and in thus holding fairly constant the temperature of the dried sand, there being a variation of only 20 deg. This has been accomplished by installing in the hopper below the discharge end of the dryer a "Mercoid" temperature control device, which operates to open or close contacts in the motor circuit of the oil-burning equipment, thus decreasing or increasing the amount of oil burned and hence the temperature in the dryer, according to an increase or decrease in the temperature of the sand coming from the dryer. This Mercoid control is made by the Mercoid Corp., Chicago, Ill., and consists of a tube with sealed-in contacts and a small amount of mercury, which is hinged and is tilted one way or the other to make or break the contact.



Delivery end of dryer, with screen through which sand falls to belt conveyor below

How the Control Operates

Connected with this tube through a toggle joint and coiled springs is a cylindrical metallic bellows element, by the movement of which it is tilted one way or the other. The bellows element is filled with a liquid and has an extended flexible tube and bulb, which is placed in the hopper where the heat from the sand is transmitted to it. An increase in temperature of the sand causes the liquid to expand the bellows and tilt the tube to open the circuit, and vice versa. The control is adjustable both as to degree of temperature and closeness of regulation, and in this case is set to hold the sand temperature between 150 deg. F. and 160 deg. F.

In this way the drying operation is carried on with very little supervision of the oil-burning equipment, and has been regulated and adjusted so that it runs along practically automatically, although the moisture in the raw sand may vary all the way from 3% to 12% at different seasons and under different weather.

The average output of the dryer is stated to be 30 tons per hour with a fuel consumption of 28 to 30 gal. of oil per hour, or in other words under average conditions a gallon of oil dries a ton of sand. With oil at 3.8c. per gal. of 154,000 B.t.u. this is considered to be cheaper than coal or gas and more easily controlled.

The plant was put into operation during the spring of 1929, and the method was worked out and developed, and patents applied for, by W. I. Sallee, sales promotion manager of the company.

The Sand Products Corp. is a reorganization made during the year 1929 of the Port Crescent Sand and Fuel Co. to include the West Michigan Sand and Fuel Co. and the Manistee Sand and Dock Co. The main offices are at Detroit, Mich., with sand producing plants near Port Crescent, Muskegon and Manistee, Mich.

Sand falls from dryer on this belt conveyor

To Have Rail Connection

PLANS ARE SAID to be under consideration by the Material Service Corp. at its Paul Ales sand and gravel plant, Lockport, Ill., to build a standard track along the old Chicago, Illinois and Eastern right-of-way to connect with the Elgin, Joliet and Eastern railroad.

At present the Ales plant is limited to shipping by trucks or water. Much of the sand and gravel sent to Chicago is transported by boat.—*Joliet* (Ill.) *News.*

Economics of the Nonmetallic Mineral Industries*

Part III—Summary of Factors in the Valuation of Deposits

By Raymond B. Ladoo

Manager of the Industrial Commodities Department, United States Gypsum Co.

LET US sort out our ideas and summarize the steps which should be taken in studying the proposed development of a new mineral deposit. Supposing someone is trying to interest us in developing a deposit of bentonite or fluorspar or barite or limestone, what should we do, or have done for us?

First; we should find out by a preliminary examination whether or not the mineral really exists of the quality and in the quantity claimed.

Second; we should have a thorough survey made of markets, prices and grades of product used by different industries. We should develop the total tonnage used per year in the area we could reach, of the quality of material we could produce, and the present and probable future trend of prices. (See later section on marketing.)

Third; we should investigate the various methods of transportation and from the results of this study decide upon a tentative plant location.

Thorough Prospecting and Sampling

Fourth; if our study so far has influenced us to believe the project has merit, we should then have the property thoroughly prospected and sampled to check up on ore reserves, quality and uniformity of product, best methods of mining or quarrying, probable cost of quarrying, etc.

Fifth; we should have representative samples converted into marketable products and submit them to several different industries for commercial testing.

Sixth; while the samples are being tested we may go ahead with definite plans for the mill. The milling process should be tentatively agreed upon, mill flow sheet prepared, and costs of construction and operation figured.

Seventh; from the results of the work outlined above, we should be able to judge whether or not the project is a good one and about how much money it will cost us to build our plant and to run it. We should then make a liberal estimate of the amount of time it will take us to build up our business to a self-sustaining basis and figure our total costs of running the business during that period. (See section on financing.)

Editor's Note

THERE are a good many things in this summary that even seasoned producers often overlook. They can make good use of it to check up their present operations, their competitors' and their prospects.

The information on the valuation of raw material deposits or reserves is particularly timely and helpful. Many important factors here are often overlooked, sometimes purposely so in the prospectus of a promoter.

Some experienced operators will not start a new project without visualizing a 50% annual return. Few would consider one of less than 20%. The reason is that any new project is highly speculative, especially in these industries.

Although the author does not say so, it is obvious that the longer an operator is in the business successfully, the lower will be the return which may satisfy him. The newcomer must consider this, too, when he decides to compete with such an established operator. For while he cannot afford to take the risk without the prospect of at least a 20% return, his old established competitor may be satisfied with 5 or 10%, having already liquidated a considerable part, or perhaps the whole, of his investment.—The Editor.

Eighth; we should now add up the amount of capital needed as follows:

Cost of property	$ .....
Cost of developing quarry or mine to point of production	.....
Cost of building mill and accessory plant construction	.....
Costs of incorporation, lawyers' and engineers' fees, etc.	.....
Cost of operation during non-profit period	.....
Permanent working capital	.....
Total capital needed	$ .....

Ninth; to the estimated production cost we should add an amount for overhead expense (including advertising, depreciation, depletion, taxes, etc.) and for selling cost.

Tenth; we can now figure from total costs, probable volume of business, and estimated selling prices, our average profit per ton and per year.

Eleventh; we must decide whether the estimated net profits will give an adequate return on the capital needed, considering risks involved.

Twelfth; the methods and costs of raising the necessary capital must be considered. What shall be the capital structure? If the money must be raised by selling stock, how much of the capital so raised must be spent for stock brokers' and salesmen's commissions, and how much will be actually put into the business? Can the plant pay an adequate return on the stockholders' investment in the business?

When all of the above questions have been answered satisfactorily we know pretty well whether or not we consider the project a profitable venture.

In the preceding discussion we have not defined two vital points: How much are we justified in paying for our property, and what is an adequate return on our capital investment?

Elements of Value in a Deposit

Valuations of non-producing properties as well as of going companies may be made on several different bases and for different purposes. In each case the final value arrived at will be different. Some of the elements of value in a deposit are:

1. Quality of raw material and of finished products which can be made from it?

2. Quantity of material which can be recovered within a reasonable time and at a reasonable cost?

3. Probable production costs lower or higher than average?

4. Freight rates to principal markets higher or lower than competition?

5. Are similar deposits plentiful in the general district or are there but very few such deposits?

6. How large annual production can the available markets be reasonably expected to absorb from this deposit?

7. How many and how large competitors would we have? How good are their deposits, plants and products and how strong are they?

8. How much net profit per year can be earned from this deposit; how much of this is due to the merit of the deposit itself and how much to other factors, such as patented

or secret processes, established trademarks, advertising, marketing ability, production skill and knowledge, research and product development?

Items 1, 2, 3, 4, 5 and 7 are fairly definite and can be reduced to actual facts or to figures in tons or dollars and cents. Item 6 is much more difficult. But to get a fair answer to Item 8 may be almost impossible. For example, we find our material is of no better and no poorer quality than that of our competitors. We have then no quality advantage or disadvantage (Item 1). The tonnage of material available can be more or less accurately determined for most minerals (Item 2). Let us say that our production costs will be about 50c. lower per ton than our competitors' costs, due to more easily worked deposit (Item 3). Freight rates to principal markets will average 25c. per ton higher than our competitors' (Item 4). This is the only known deposit of anything like our quality, not already in competitors' hands, within our shipping radius (Item 5). Our market survey will show us how much we can sell per year (Item 6), and from Items 2 and 6 we can estimate the life of the deposit, rate of depletion, etc.

It is fairly easy to estimate how much net profit we can make per year, but not so easy to decide how much of this profit is due to the deposit itself. If two companies operate identical deposits, side by side, one will make more profit per ton and per year than the other. Superior operating ability, trade connections, financial strength and so on, account for the difference. The deposit of the stronger company is worth more to that company than that of the weaker company is to its owner, because the stronger company can make more money from its deposit. If the stronger operator were deprived of his deposit, say by condemnation for a public park, he would lose more than the other operator would under similar circumstances, provided there were no other equally desirable properties available at a fair price. As a property of a successful operating company a deposit acquires value not possessed by an unworked deposit in private hands.

Present Market Value

If we buy a deposit as future raw material reserves and do not intend to work it for several years, it is worth much less to us than if we need it for immediate operation. If a mineral property is part of a large estate which must be settled and a quick sale is essential the immediate value may be very low unless a customer can be found who really needs it and can use it profitably. If similar properties change hands rather frequently, or if they are worked on a royalty basis, these sales prices and royalty rates are valuable factors in estimates of present market values.

Occasionally we find a unique deposit—the only one of its kind within a wide radius—with freight rates to principal markets much lower than from any other deposit. If other factors, such as climate, labor supply, and so on, are equally favorable, the deposit has outstanding merit. It has a definite intrinsic value which can be capitalized by operators who have ability and sufficient capital to build a plant and run it on a sound basis. The annual earnings which would result from the freight rate differential constitute one of the elements in the valuation of the property.

Fortunately or unfortunately the determination of true value is often only of academic interest. The seller sets a price which he is willing to take. The prospective buyer fixes in his own mind—often very arbitrarily—the maximum amount he is willing to pay. Somewhere between these two figures the sale is made, if at all. At the figure agreed upon, however, the buyer can estimate fairly closely how much he can make on his investment.

What Is a Fair Return on a Rock Products Investment?

What is a fair return on investments of this type? This depends upon many things. We must first remember that a mineral deposit is a wasting asset. If our raw material reserves are rather limited, every ton we remove reduces the value of the deposit and consequently of our investment. Unless adequate provision is made for creating a depletion fund or in some way for taking care of this item (and this usually is not done), the return on our investment must be large enough eventually to return our capital plus interest.

A most important factor is the amount of risk involved. Is the industry a strong, stable one? Are prices liable to hold firm, or is the market in a demoralized condition and likely to stay that way for some time? Does our project have such outstanding merit that it could survive a severe depression? It would do us little good to get a 20% dividend for three or four years and then have our company go to the wall and lose our capital investment.

Some companies will not venture on a *new* project unless they can see a 50% return per year. Others, and among them sound, well established companies, ask for the assurance of probable returns of 25 to 40% before they will launch a new product or process or open a new plant. Experience has taught them that the favorable conditions may not last long. New products may drive out the old, new deposits closer to markets may be found, import tariffs may change, freight rates may be increased, and so on. They feel they must get their principal back rapidly if they are to be sure of its return at all. Of course new products and processes are started and new plants built for reasons other than increased profits. Obsolescence, new competitive products and so on may compel new plant construction merely to protect present profits.

Considering all of the risks involved few or perhaps no new nonmetallic mineral projects should show a prospective return on investment of less than 15%. An indicated return of 20% would be a safe basis for most fairly conservative projects. Higher returns, up to 50% or more, should be indicated for highly speculative ventures. By "indicated return" we mean, of course, the annual return on investment estimated by the well balanced, conservative judgment of experienced men. "Indicated returns" claimed by promoters must usually be discounted to a greater or lesser degree depending upon the extent of their natural optimism and their experience and reliability, or lack of these characteristics.

(*To be continued*)

Co-operative Selling Successful in the South

CO-OPERATIVE SELLING in Florida in the rock products industries has proved the salvation of the industries so engaged. For several years the limerock producers in Florida and south Georgia have sold their products through a central sales agency, the sales agency purchasing limerock from the various producers, paying them a base price. The amount purchased from each of the member companies is dependent upon plant location, freight charges, etc. Member producer companies hold stock in the sales company in proportion to their 1926 tonnage production so that the member company has two opportunities to profit; first, from the base price paid it by the sales company and second the profits of the sales organization. This arrangement does not conflict with any anti-trust laws as all of the producers in the district are not stockholders in the sales organization.

Stone Sales Organization

Another sales organization in Florida is that of the Florida Crushed Stone Co., with offices in Tampa. This sales organization handles the sales of a greater part of the limestone or "hard rock" production of the state. It has for years handled the sales of the plant of the Camp Concrete Rock Co., at Camp, Fla. (near Brooksville) and the Consolidated Rock Products Co., with a plant also near Brooksville, Fla. Recently, it was reported that this sales organization had taken over the selling of the output of the Crystal River Rock Co. with plant at Crystal River, Fla. This latter operation is primarily a ballast producer and is the largest hardrock plant in the state.

No doubt stimulated by the successes that these sales organizations have had, reports are that some such an arrangement is being contemplated by the lime industry of the South Atlantic States, including Georgia, Alabama and Florida.

Study of a Group of Crushing Plants in the Central West

Part VII—Storage of Crushed Stone

By Earl C. Harsh
Associate Editor, Rock Products

A unique piling and reclaiming system for washed fine stone

AT practically all quarrying and crushing operations, a certain amount of crushed stone in the various sizes is handled in and out of storage. This seems to be the generally accepted best way of equalizing production with orders, as well as enabling the plant to take care of peak orders for certain sizes.

Hence a storage of from 50,000 to 100,000 tons total of the different sizes is maintained at each plant so far as possible and feasible, depending upon a number of factors, such as the margin between sales and production, expected orders, duration of winter shutdown periods, etc.

The same method of storage is used at more than 90% of the plants under consideration, and consists in putting each size by itself in an open stockpile along railroad sidings adjacent to the plant. A single, steam-operated locomotive crane with a clamshell bucket is used at each plant to make the piles and also to load out from them.

During the operating season surplus material is drawn from the bins into Western type, side-dump, standard-gage cars and switched to the storage pile and dumped. At a few of the plants 5 and 6-yd. cars are used, but at most of them this material is handled in one or two double-truck 12 or 15-yd. cars. In a few instances standard railroad cars are used at times for moving this material out to storage, particularly in the case of the smaller sizes, which are more easily handled by the clamshell than the coarser sizes.

Usually one locomotive suffices to move these cars as well as take care of the other switching at the bins, although at several of the plants two locomotives are used.

These locomotives are somewhat heavier as a rule than those used in the quarry, and of course are standard gage in all cases. They are practicaily all steam driven, with two or three exceptions, and range in size from 20-ton up to as large as 80-ton in one instance, while about half of them are of the 30- to 50-ton sizes.

The locomotive cranes used for handling the material in and out of storage are practically all of the 20-ton size with a 1½-yd. or in some instances a 1¼-yd. bucket.

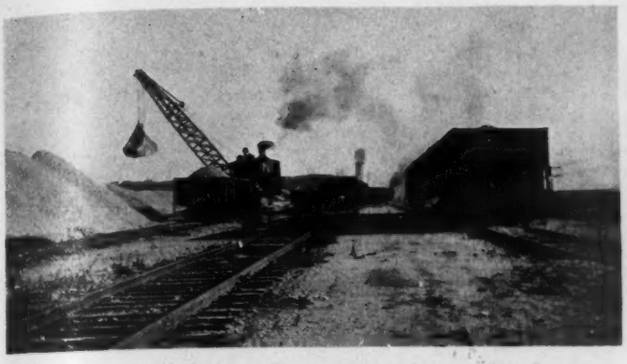
At three or four of the plants a small electric or gasoline shovel is used as an auxiliary as needed. At one plant where the shipments are by truck the material to be stored is dumped into the quarry from trucks and then reclaimed from the quarry

Editor's Note

WITH this installment the series by Mr. Harsh, begun August 16, 1930, is brought to a close. Following the introductory article, the author has taken up the subjects of stripping operations, drilling and blasting, quarry loading and transportation, crushing and screening, and quarry pumping. It has been a rather unique series, inasmuch as Mr. Harsh has not been considering ideal conditions nor, indeed, has he been confining his observations to newly constructed plants. Instead, he has taken a group of plants in one particular location and analyzed the various operations as he found them in actual practice.

Material dumped into storage piles on quarry floor and later loaded into trucks

View of typical storage piles, with each size in a separate pile



Loading crushed stone from storage into railroad cars with locomotive crane

Typical arrangements for the storage of crushed stone

Locomotive crane loading railroad hopper cars from storage

Locomotive crane unloading from railroad car to pile

Part of quarry floor used for the storage of crushed stone

Typical storage piles with locomotive crane

Type of portable loading bin used at some plants for loading out of storage

Type of car used at some plants for moving stone to storage piles

Typical view of storage yards adjacent to some of the crushed stone plants discussed

floor by a small steam or gasoline shovel reloading direct to trucks.

At quite a number of the plants the trucks at the storage piles are raised a few feet, or the adjacent ground excavated down a few feet alongside the tracks, as the case may be, so that there is ample space for dumping the cars, which arrangement avoids delay in handling them and allows the crane more freedom in handling this material to the storage piles.

Portable steel truck loading bins are used at a number of the plants to facilitate the loading of trucks from storage. These bins have a capacity of about 60 tons and are moved about as required by the locomotive crane. They are filled by the crane at intervals as necessary, leaving the crane free for other work.

In some cases part of the quarry is utilized as storage space, particularly where the quarry is not too deep to permit running a railroad track down to the quarry floor, or where the loadings from storage are to trucks.

At one of the plants quite an extensive system of storage and reclaiming is used for the small sizes, which are pumped out and washed as a separate operation.

Gravel Pit to Augment City Water Supply

A CITY WATER DEPARTMENT crew has completed the installation of a pump, motor and other essential equipment at the pit of the Eau Claire Sand and Gravel Co., Eau Claire, Wis., and has connected it. All that now remains is installation of power transformers.

The pump installed by the water department has a capacity in excess of 700 gal. per min. According to the recommendation of C. V. Seastone, one of the representatives of Daniel W. Meade, engineer engaged by the city council to prepare plans for a possible new water supply for the city, the wells are to be pumped at capacity for three weeks at least, after which time samples of water are to be taken and sent to Madison for analysis, both for mineral and bacterial content.—*Eau Claire* (Wis.) *Leader.*

Lime Sellers Meet Buyers at Farm Show

By Thos. H. Wittkorn

LIME AND FERTILIZER manufacturers were well represented at the 15th Annual Pennsylvania Farm Products Show held in January at Harrisburg. It was lucky for them too, because the show turned out to be the greatest winter agricultural exposition ever held in this country. Close to a quarter of a million people visited the new 10-acre building used this year for the first time to house a complete display of livestock, farm products and the commercial exhibits of more than 300 firms which cater to the needs of country people.

Lime and Limestone Exhibits

While the Keystone State felt the effects of the severe drought last summer there are other sections of the country which fared far worse and the attitude of its farmers seems to be that business this summer must go on the same as usual and about the average amount of supplies must be bought. One result of the unusual weather conditions last summer has been to multiply the number of scales and insects and make spraying this year more essential than it has been for some time back. Extra broods had a chance to come through and the absence of heavy rains to wash trees allowed many a small foe to remain a trouble maker this year.

The Universal Gypsum and Lime Co., Chicago, Ill., had a booth in charge of S. D. Moxley and W. S. Hamme, with a full line of its spraying and agricultural lime.

The Chemical Lime Co., Bellefonte, Penn., showed its full line of agricultural lime. M. Slack, sales manager of the company from Duboise, Penn., was in charge of the booth and spent much of his time schooling salesmen of Baugh and Sons Co., Philadelphia, who will add this line this year.

The Limestone Products Corp. of America, Newton, N. J., had an attractive space in the poultry section to tell of its "Lime Crest Calcite."

The Landis Stone Meal Co., Rheems, Penn., not so far from Harrisburg, made an extensive showing of its poultry grits, pulverized limestone and feeding calcium. H. J. Landis, proprietor of this business, has been at it for 16 years and does an extensive trade with motor trucks within a radius of 150 miles of his quarry.

The Portland Cement Association had a farm building block demonstration under the supervision of Jack Horner, Carlisle, Penn. It was next to the exhibit of the Harrisburg Building Block Co., Thomas Bausman, sales manager, which made the 100,000 Straub cinder blocks used in constructing the farm show building.

Fertilizer representatives at the show were in no wise downcast over the year they had just finished. True, they did not do much business during the show week, but they met a lot of dealers and users who are all expecting to do about the usual amount of tonnage when the season opens. The tendency on the part of most buyers is for the higher grade goods and the cash buyers are going to be "choosey."

Developing Old Indian War Paint Industry?

PLANS for establishing a clay manufacturing plant to make cosmetics and other products are under way at Warm Springs, Ga., is was announced by Wade Moss and Mrs. Brice Moss, who are interested in the enterprise. The new company, which will be known as Cosmetique, Inc., has applied for a charter, with authorized capital of $100,000 and the privilege of increasing it.

Options were said to be held by the company on several hundred acres of land in Meriwether county. During the World war several hundred cars of high grade white bauxite were shipped from Warm Springs, it was said.—*Americus* (Ga.) *Recorder.*

Researches on the Rotary Kiln in Cement Manufacture†

Part XVII—On the Preheating of the Entering Air by Means of Hot Clinker

By Geoffrey Martin

D.Sc. (London and Bristol), Ph.D., F.I.C., F.C.S., M. Inst. Chem. Eng., M. Inst. Struct. Eng., M. Soc. Pub. Analysts, F. Inst. Fuels; Chemical Engineer and Consultant; Former Director of Research of the British Portland Cement Research Association; Author of "Chemical Engineering"

Abstract

***THE NECESSITY** of preheating all the air possible for combustion to the highest possible temperature is treated in this installment.*

Some 15% of the air for combustion enters the kiln practically cold, with the powdered fuel.

The highest temperature to which it is possible to preheat the air from the cooling clinker is 2500 deg. F.

Under certain conditions the efficiency in the ideal kiln is increased by heating an excess of the air actually needed for combustion to 2500 deg.

In modern practice, however, because of the heat transferring inefficiency of the clinker cooler, it is not possible to preheat the air to much above 900 deg. F. The average temperature attained in practice probably does not exceed 400 deg. F.

THE TEMPERATURE at which clinker issues from the ordinary cement kiln is about 2500 deg. F.

The following figures shown in Table I have been ascertained regarding the clinkering temperature of different kilns by different observers at different times.

No doubt different mixtures have different clinkering temperatures.

In the following calculations the temperature of the clinker is taken as 2500 deg. F. (1371 deg. C.).

If the maximum temperature that the clinker attains in the furnace is 2500 deg. F. (1371 deg. C.), and if the hot clinker passing away from the kiln is made to give up its heat to the incoming air, the air cannot be preheated to a higher temperature than 2500 deg. F. (1371 deg. C.), or it would become hotter than the clinker from which it derives its heat.

The weight of air required to burn 1 lb. of standard coal has previously been shown to be 10.478 lb. (see Part XI).

It is of interest to ascertain what weight of clinker issuing from the furnace at 2500 deg. F. (1371 deg. C.) is required in order to raise 10.478 lb. of air to 2500 deg. F. (1371 deg. C.).

The calculation may be carried out as follows: The specific heat of portland cement clinker has been determined very exactly over a wide range of temperature by S. H. Harrison, M. E., and Dr. Walter P. White, of the Geophysical Laboratory,* Washington, U. S. A., who gave the following formula for the mean specific heat of clinker between 0 deg. and t deg. C.:

$$S_m = 0.1754 + 139144 \vee 10^{-9}t - 125 \times 10^{-9}t^2 + 4685 \times 10^{-14}t^3 \quad . \quad . \quad . \quad (1)$$

Now, assuming that the temperature of the clinker is 2500 deg. F., or 1371 deg. C., we obtain the *mean specific heat* S_m of the clinker between 0 deg. and 1371 deg. C. by inserting $t = 1371$ deg. in formula (1), and thus obtain

$S_m = 0.2519$ between 0 deg. and 1371 deg. C.
(32 deg. to 2500 deg. F.)

From our tables of mean specific heats the *mean* specific heat of air between 32 deg. and 2500 deg. F. is 0.2533. Hence, on the assumption that x lb. of the clinker in sinking from 2500 deg. to 60 deg. F. heats 10.478 lb. of air from 60 to 2500 deg. F., we have:

$$\begin{array}{lccccccccc} & \text{Weight of clinker} & & \text{Specific heat of clinker} & & \text{Range of temperature degree} & = & \text{Weight of air} & & \text{Specific heat of air} & \text{Range of temperature degree} \\ & x & \times & 0.2519 & \times & (2500-60) & = & 10.478 & \times & 0.2533 & \times (2500-60) \end{array}$$

or

$$x = 10.478 \times \frac{0.2533}{0.2519}$$

$$= 10.54 \text{ lb. of clinker.}$$

So that 10.54 *lb. of clinker at* 2500 *deg F. can preheat* 10.478 *lb. of air from* 60 *deg. to* 2500 *deg. F.*

It will be noticed that the mean specific heat of air and clinker may, for practical purposes, be taken as equal.

In Part XV a table was given (Table I) showing the number of pounds of clinker which is theoretically producible by the combustion of 1 lb. of standard coal when the flame temperature attains different values.

It is of considerable practical importance in the design of rotary kilns to know to what temperature the incoming air necessary for combustion of the coal can be heated by the outgoing clinker.

TABLE I—OBSERVED TEMPERATURES OF CLINKER AT THE CLINKERING TEMPERATURE IN THE ROTARY KILN

Works	Observer	Method of observing	Temperature of clinker
No. 9	B. P. C. R. A.	Optical pyrometer	2554 deg. F. (1401 deg. C.)
No. 10	B. P. C. R. A.	Optical pyrometer	2447 deg. F. (1342 deg. C.)
No. 11	B. P. C. R. A.	Optical pyrometer	2298 deg. F. (1259 deg. C.)
No. 26	B. P. C. R. A.	Optical pyrometer	2444 deg. F. (1340 deg. C.)
	J. C. Gullen*	Seger cones	2552 deg. F. (1400 deg. C.)
Rudersdorf (1923)	R. Nacken†	Pt-Rh-Thermocouple	2498 deg. F. (1370 deg. C.)
Lehigh Valley (1905)	E. C. Soper‡	Pt-Rh-Thermocouple	2496 deg. F. (1369 deg. C.)
Rudersdorf	H. Kühl§		2552 deg. F. (1400 deg. C.)
	O. Schott‖		2552 deg.-2642 deg. F. (1400 deg.-1450 deg. C.)
	A. C. Davis¶	Lab. experiments	2552 deg. F. (1400 deg. C.) A reduction of 3% in $CaCO_3$ reduces calcining temperature by about 50 deg. C.

*Private communication.

†*R. Nacken, Protokoll der Verhandlungen des Vereins Deutschen Portland-Cement-Fabrikanten* (E.V.), Charlottenburg, 1921, p. 184.

‡*E. C. Soper,* "Report on a Test of a Portland Cement Plant," *Engineering News,* 1905, liv., Nr. 25, p. 664.

§*H. Kuhl, Protokoll der Vanderhandlungen des Vereins Deutschen Portland-Cement-Fabrikanten* (E.V.), Charlottenburg, 1922, p. 200.

‖*O. Schott,* "Dissertation," 1906. "Clinker Attains."

¶*A. C. Davis,* "Manufacture of Portland Cement."

*"Report on the Specific Heat of Portland Cement Clinker," by S. H. Harrison, M.E. Committee on Conservation Portland Cement Association of U. S. A. (1923).

The calculation may be carried out in the same way as described in the foregoing.

For example, with a theoretical flame temperature of 4160 deg. F. (2293 deg. C.), 1 lb. of standard coal could produce 10.397 lb. of clinker; and this clinker, issuing at 2500 deg. F., could preheat the incoming 10.478 lb. of air necessary for the combustion of the 1 lb. of coal to a temperature T deg. F., which is determined by the following equation:

Weight of air	×	Specific heat of air at 2500 deg. F.	×	Range of temperature degree	=	Weight of clinker	×	Specific heat of clinker	×	Range of temperature degree
10.478	×	0.2533	×	$(T-60)$	=	10.397	×	0.2519	×	(2500—60)

or $T = 2468$ deg. F.

The next weight of *clinker* on the list of Table I, Part XV, is 10.125 lb., corresponding to a flame temperature of 4100 deg. F. (2260 deg. C.). As there is less clinker now produced per 1 lb. of coal burned, the 10,478 lb. of air will not be preheated to quite such a high temperature as before, and we must make an allowance for the variation in the specific heat of the air, which is much less at low temperatures than at high temperatures,

Value of T Determined in Another Way

This is done as follows: We take the former temperature of 2468 deg. F. attained by the air in the preceding case to be the approximate temperature of the air attained in the present case. We then take the mean specific heat of air at 2468 deg. F. to be the correct value of the mean specific heat to put in our equation for determining T deg., the temperature to which the air can be heated by the clinker.

We thus obtain the new equation for determining T, thus:

Weight of air	×	Specific heat of air at 2468 deg. F.	×	Range of temperature degree	=	Weight of clinker	×	Specific heat of clinker	×	Range of temperature degree
10.478	×	0.2530	×	$(T-60)$	=	10.125	×	0.2519	×	(2500—60)

whence $T = 2408$ deg. F.

To aid calculation a general formula may be worked out as follows:

If S_m be the mean specific heat of the air between T deg. and 60 deg. F., and W be the weight of clinker produced, we have, as before

$$10.478 \times S_m \times (T-60) = W \times 0.2519 \times (2500-60),$$

or
$$T \text{ deg.} = 60 + 58.66\frac{W}{S_m} \quad \ldots (2)$$

By substituting in this formula successive values of W from Table I, Part XV, and the corresponding successive values of S_m, corresponding to the various values of T deg., the calculation may be easily effected. T deg. is in degrees F.

By proceeding in this way, Table II was calculated, showing (under 3) the maximum temperature to which the incoming air can be preheated by different weights of out-

TABLE II—MAXIMUM TEMPERATURE TO WHICH INCOMING AIR CAN BE PREHEATED BY THE OUTGOING CLINKER IN KILNS PRODUCING DIFFERENT YIELDS OF CLINKER

Assumption.—1 lb. standard coal requires 10.478 lb. air. Mean specific heat of clinker between 60 deg. and 2500 deg. F. is 0.2519.

(1) Lb. of clinker produced per 1 lb. of standard coal of 12,600 B.t.u. fired in kiln	(2) Tons of standard coal consumed per 100 tons* clinker produced	(3) Maximum temperature in degrees to which incoming combustion air can be preheated by outgoing clinker		10.478 lb. of air per 1 lb. of standard coal burned
W	$\frac{100}{W}$	$T = 60 \text{ deg.} + 58.66\frac{W}{S_m}$		
		Deg. F.	Deg. C.	
0.000	.....	60	15.6	
0.065	1538.5	76	24	
0.411	243.31	164	73	
0.760	131.58	252	122	
1.111	90.00	340	171	
1.466	70.13	428	220	
1.824	54.82	516	269	
2.185	45.77	605	318	
2.549	39.25	694	368	
2.915	34.30	781	416	
3.283	30.46	872	467	
3.320	30.12	881	472	
3.359	29.77	891	477	
3.395	29.45	899	482	
3.432	29.14	910	488	
3.469	28.83	917	492	
3.507	28.51	926	497	
3.545	28.21	935	502	
3.582	27.92	944	507	
3.619	27.63	953	512	
3.656	27.35	962	517	
3.693	27.08	970	521	
3.731	26.80	979	526	
3.769	26.53	988	531	
3.806	26.27	997	536	
3.843	26.02	1006	541	
3.882	25.76	1015	546	
3.919	25.52	1024	551	
3.956	25.28	1033	556	
3.993	25.04	1041	561	
4.032	24.80	1047	564	
4.413	22.66	1137	614	
4.795	20.85	1226	663	
5.181	19.30	1315	713	
5.568	17.96	1403	762	

(1) Lb. of clinker produced per 1 lb. of standard coal of 12,600 B.t.u. fired in kiln	(2) Tons of standard coal consumed per 100 tons* clinker produced	(3) Maximum temperature in degrees to which incoming combustion air can be preheated by outgoing clinker		10.478 lb. of air per 1 lb. of standard coal burned
W	$\frac{100}{W}$	$T = 60 \text{ deg.} + 58.66\frac{W}{S_m}$		
		Deg. F.	Deg. C.	
5.963	16.77	1494	812	
6.359	15.73	1584	862	
6.761	14.79	1674	912	
7.165	13.96	1764	962	
7.570	13.21	1853	1012	
7.984	12.52	1944	1062	
8.408	11.89	2039	1115	
8.680	11.52	2102	1150	
8.785	11.38	2121	1160	
9.045	11.06	2178	1192	
9.311	10.74	2236	1224	
9.580	10.44	2293	1256	
9.8498	10.15	2352	1289	
10.125	9.88	2408	1320	
10.397	9.62	2468	1353	
10.540	9.49	2500	1371	
10.675	9.37	2500	1371	
10.954	9.13	2500	1371	
11.239	8.90	2500	1371	
11.522	8.68	2500	1371	
11.806	8.47	2500	1371	
12.094	8.27	2500	1371	
12.386	8.07	2500	1371	
12.675	7.89	2500	1371	
12.972	7.71	2500	1371	
13.271	7.53	2500	1371	
13.575	7.37	2500	1371	
13.873	7.21	2500	1371	
14.177	7.05	2500	1371	
14.485	6.90	2500	1371	
14.793	6.76	2500	1371	
15.102	6.62	2500	1371	
15.414	6.49	2500	1371	
15.732	6.36	2500	1371	

*Tons in every instance are British tons of 2240 lb.; to convert to American tons of 2000 lb. multiply by 1.12.

going clinker, the clinker being assumed to attain a maximum temperature of 2500 deg. F. in the furnace:

On looking down this table it will be seen that in the rotary kilns consuming 28.2 to 34.3 tons* of standard coal per 100 tons* clinker, it would be possible to preheat the entering air from 935 deg. to 781 deg. F.

Since at least 15% of all the air required enters *cold* with the coal dust, the remaining air passing up the clinker shoot could be heated to temperatures about 15% in excess of these temperatures. The heavy loss of heat from the coolers by radiation, however, would greatly reduce the efficiency of the heat interchange between the air and the clinker, and it may well be doubted whether in many modern rotary kilns the mean temperature of air where it meets the coal dust possesses an average temperature much exceeding 400 deg. F.

There is obviously much room for improvement in the coolers of the ordinary rotary kiln.

The lower the clinker output of the kiln per 1 lb. coal burned, the lower is the temperature to which the air can be preheated.

Several points in this table call for comment. We have seen that the incoming air cannot be heated by the outgoing clinker to a temperature higher than 2500 deg. F. or 1371 deg. C. (as this is the maximum temperature which the clinker itself attains in the furnace), and also that when the weight of clinker produced per 1 lb. of coal burned reaches the value of 10.54 lb., the 10.478 lb. of air needed for the combustion of 1 lb. of coal attains its maximum temperature of 2500 deg. F. (1371 deg. C.). So that any increase in the yield of clinker per 1 lb. of coal burned beyond 10.54 lb. of clinker does not lead to any possible increase in the temperature to which the incoming air can be preheated. Consequently, the temperature of the air remains steady at 2500 deg. F. in the table, while the clinker produced per 1 lb. of coal burned increases from 10.54 lb. of clinker to as high as 15.732 lb. of clinker, which is the theoretical maximum amount producible.

This opens up another question. Up to the point where the yield of clinker reached 10.54 lb. per 1 lb. of standard coal burned, the coal is supplied with the requisite amount of air—namely, 10.478 lb.—needed for normal combustion, which is preheated to the maximum temperature of 2500 deg. F. by the clinker. But when the yield of clinker per 1 lb. of coal increases beyond 10.54 lb., the amount of outpouring clinker is sufficient to preheat *more than* 10.478 *lb. of incoming air to* 2500 *deg. F.* So that it would in such a case be possible to supply the 1 lb. of coal with *more than* the necessary 10.478 lb. of air preheated to 2500 deg. F.

The exact weight of air which can be thus supplied is shown in Table III above.

TABLE III—SHOWING WEIGHT OF AIR IN LB. WHICH CAN BE PREHEATED TO 2500 DEG. F. BY A GIVEN WEIGHT OF CLINKER

Tons* of standard coal consumed per 100 tons* of clinker	Lb. of clinker produced per 1 lb. of standard coal burnt of 12,600 B.t.u. per lb. W	Weight of air which can be preheated to 2500 deg. F. by the clinker. $0.9945W$,	Weight of air in excess of that needed for normal combustion, which can be preheated to 2500 deg. F. by the clinker. $0.9945W$—10.478
		Lb.	Lb.
9.49	10.540	10.478	0.000
9.37	10.675	10.620	0.142
9.13	10.954	10.896	0.418
8.90	11.239	11.178	0.700
8.68	11.522	11.461	0.983
8.47	11.806	11.744	1.266
8.27	12.094	12.028	1.550
8.07	12.386	12.322	1.844
7.89	12.675	12.607	2.129
7.71	12.972	12.902	2.424
7.53	13.271	13.200	2.722
7.37	13.575	13.503	3.025
7.21	13.873	13.796	3.318
7.05	14.177	14.100	3.622
6.90	14.485	14.405	3.927
6.76	14.793	14.713	4.235
6.62	15.102	15.028	4.550
6.49	15.414	15.330	4.852
6.36	15.732	15.649	5.171

The weight of air is calculated from the equation:

weight of air × specific heat of air × rise of temperature degree of air.
= weight of clinker × specific heat of clinker × fall in temperature of clinker.

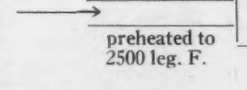
Taking the mean specific heat of the air between 60 deg. and 2500 deg. F. as 0.2533, and that of clinker as 0.2519, we get, if W be the required weight of air:

$W \times 0.2533 \times (2500 - 60)$ = weight of clinker $\times 0.2519 \times (2500 - 60)$,

which reduces to:

weight of air = 0.9945 × weight of clinker.

Hence it appears that if a kiln were constructed so as to yield anything over 10.54 lb. of clinker per 1 lb. of coal burned (or 100 tons* clinker per 9.49 tons* of standard coal of 12,600 B.t.u per lb.), it would be possible to feed the coal with air in excess of that needed for normal combustion, all this air being preheated to the clinkering temperature of 2500 deg. F. (1371 deg. C.) by the outgoing clinker; and when the theoretical limit of clinker production was reached (viz., 100 tons* clinker for 6.36 tons* of standard coal, or 15.732 lb. of clinker per 1 lb. of standard coal consumed), it would be possible under these circumstances to supply no less than 5.171 lb. of excess air thus heated to each 1 lb. of coal consumed—a very large amount of hot air, for, since 1 lb. of coal only requires 10.478 lb. of air, the



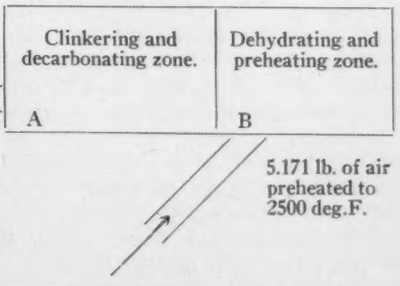
excess air would be $\frac{5.171}{10.478} \times 100 = 49.3\%$

excess air over that needed for normal combustion.

The question now arises: Is there any advantage to be derived in thus feeding the kiln with great excess of air preheated to 2500 deg. F. (1371 deg. C.) by the outgoing clinker?

The answer is "*Yes*"—if we only supply the normal amount of air, no increased yield will result whether this hot excess air be introduced either with the coal through the clinkering zone, or whether it be introduced at a later stage than the clinkering zone, and be used for preheating the slurry as it enters the kiln.

But this excess of hot air would certainly have to be introduced into the kiln for heat economy, otherwise (1) it would not be possible to recover all the heat from the clinker and put it back into the kiln (this is the calculated weight of air which just achieves this purpose); (2) there would not be sufficient total heat supplied to the lower part of the kiln to carry out all the necessary operations of preheating the slurry and dehydrating the clay so as to yield 15.732 lb. of clinker per 1 lb. of coal burned. A heat balance in detail has been worked out which shows that this is the case:



Suppose that the kiln is producing the maximum amount possible of clinker (see Part XV), namely, 15.732 lb. of clinker per 1 lb. of standard coal burned (of 12,600 B.t.u. per lb.), and suppose that *all* the heat escaping with the clinker is restored to the furnace by 15.649 lb. of entering air, which is thus preheated to 2500 deg. F., as shown in Table II.

*Tons in every instance are British tons of 2240 lb.; to convert to American tons of 2000 lb. multiply by 1.12.

For convenience in following what will occur, we will allow the preheated air to enter in two portions, viz., 10.478 lb. at A—the amount necessary for burning 1 lb. of coal—and the excess 5.171 lb. of hot air at B.

The 10.478 lb. of air entering at A, and there uniting with 1 lb. of standard coal, will produce a theoretical flame temperature of 5370 leg. F., as shown in Part XIII, and the 11.278 lb. of furnace gas passing down the clinkering and decarbonating zone and issuing at 1481 deg. F. will produce in this zone (as shown in Part XV) 15.732 lb. of clinker as the result of decomposing 24.547 lb. of dry slurry. If now the hot gases evolved in the formation of this weight of clinker be allowed to proceed down the kiln into the dehydrating and preheating zone, it can be easily calculated that they do not contain enough heat to do the necessary work of preheating and dehydrating the slurry before it enters the decarbonating zone. Thus, if we allow the gases to escape from the kiln at 60 deg. F.—after having given up all their heat to the raw material—we will find:

(1) That the B.t.u.'s from 11.278 lb. of the gases of combustion sinking from 1481 deg. to 60 deg. F. are 4628.
(2) That the B.t.u.'s from the CO_2 from the slurry sinking from 1481 to 60 deg. F. are 2925.
(3) That the B.t.u.'s liberated from the water expelled from the kaolin are 699.5.
(4) That the B.t.u.'s liberated from the water in the silica are 233.6.

Hence the total available heat from the bases is:

$$4628 + 2925 + 699.5 + 233.6 = 8486.9 \text{ B.t.u.}$$

Not Enough Heat

But, as shown in Part X, in order to preheat 24.547 lb. of slurry from 60 deg. to 1481 deg. F., we will require 10.265 B.t.u.

Hence there is not enough heat in the furnace gases to do this, and there is missing:

$$10265 - 8487 = 1778 \text{ B.t.u.}$$

So that, what would happen, unless this extra amount of heat were supplied to the lower part of the kiln, is that the cold undehydrated and unpreheated raw slurry would pass into the decarbonating zone, and the heat used for expelling the CO_2 from the calcium carbonate would now be utilized in preheating the slurry. So that less calcium carbonate would be now decomposed, and this would reduce the clinker formed until finally the missing heat would be supplied to the lower zone at the expense of the upper zone, until equilibrium was once more obtained. A decrease in clinker output, therefore, could only be avoided by allowing the extra 5.173 lb. of *hot air* (preheated to 2500 deg. F.) to enter the preheating zone at the point B. This could supply 1786 B.t.u. in passing down the kiln, and so supply the missing amount of heat and allow a clinker production of 15.732 lb. per 1 lb. of coal to proceed continuously in the upper zone.

In other words, we have proved from the heat balance that under these special conditions the kiln must receive more hot air than corresponds to normal combustion (10.478 lb. of air per 1 lb. of coal) if the output of the kiln is to be kept up.

Of course, the net effect would be the same if the excess of hot air were allowed to enter with the coal at A in the upper part of the kiln instead of at B. An initial increased output of clinker from the upper part of the kiln would be speedily brought down to the above figure on account of the gases not containing sufficient heat to effect the necessary preheating and dehydrating operations in the lower part of the kiln.

Another important point which arises in connection with matter discussed in the preceding paragraph is this: Would it be possible to increase the output of clinker by supplying a kiln with air in *excess* of that normally needed for combustion (viz., 10.478 lb. of air to 1 lb. of standard coal), this air preheated by the outcoming clinker in such a way that all the heat contained in the outpouring clinker is restored to the furnace by the air?

It is proved in what will follow that the answer to this question is *No*, except in the very special case (discussed above), where the yield of clinker per 1 lb. of coal burned is exceeding 10.54 lb.

(To be continued)

Something Less Than 500 Producers Account for 90 Percent of All Commercial Crushed Stone

A TOTAL PRODUCTION of 92,721,260 tons of commercial crushed stone during 1929 was reported to the United States Bureau of Mines, Department of Commerce, by 1453 operating companies. This includes concrete aggregate, road metal, and railway ballast but does not include flux stone, agricultural limestone, and other crushed stone products.

In the following table the Bureau of Mines has tabulated the production figures in groups of companies (not individual plants) according to the tonnages they produced during the year.

A study of the table reveals the rather surprising fact that 869, or 60% of all the companies produced less than 25,000 tons each, during 1929, and their total combined production was only 7½% of the country's total.

Of the remaining 584 companies, all producing over 25,000 tons annually, 299, or 51%, accounted for only 14.26% of the total production.

Observed from another angle, 50% of the United States production of crushed stone in 1929 came from 1369 companies. This means that 84, or less than 6%, of the operating companies produced 50% of the stone, and further, that these 84 companies all produced over 250,000 tons each.

Many other groupings of equal interest may be made by a study of the attached table.

PRODUCTION OF CRUSHED STONE IN THE UNITED STATES IN 1929

	Companies			Production		
Tons	Number	Per cent. of total	Cumulative percentage	Tons	Per cent of total	Cumulative percentage
1-999	118	8.1	.....	46,410	0.05	.....
1,000-4,999	272	18.7	26.8	754,020	0.81	0.86
5,000-9,999	175	12.0	38.8	1,213,570	1.31	2.17
10,000-14,999	132	9.1	47.9	1,590,940	1.72	3.89
15,000-19,999	96	6.6	54.5	1,626,100	1.75	5.64
20,000-24,999	78	5.4	59.9	1,697,800	1.83	7.47
25,000-49,999	191	13.2	73.1	6,674,990	7.20	14.67
50,000-74,999	108	7.4	80.5	6,543,220	7.06	21.73
75,000-99,999	60	4.1	84.6	5,065,630	5.46	27.19
100,000-124,999	35	2.4	87.0	4,083,390	4.40	31.59
125,000-149,999	49	3.4	90.4	6,601,010	7.12	38.71
150,000-174,999	22	1.5	91.9	3,543,610	3.82	42.53
175,000-199,999	12	0.8	92.7	2,232,400	2.41	44.94
200,000-249,999	21	1.5	94.2	4,617,640	4.98	49.92
250,000-299,999	15	1.0	95.2	4,111,010	4.43	54.35
300,000-399,999	29	2.0	97.2	10,033,160	10.82	65.17
400,000-499,999	6	0.4	97.6	2,533,650	2.73	67.90
500,000-599,999	12	0.8	98.4	6,485,920	7.00	74.90
600,000-699,999	5	0.4	98.8	3,132,640	3.38	78.28
700,000-799,999	3	0.2	99.0	2,233,260	2.41	80.69
800,000-899,999	4	0.3	99.3	3,339,610	3.60	84.29
900,000-999,999	3	0.2	99.5	2,911,780	3.14	87.43
1,000,000-1,999,999	5	0.5	100.0	11,649,500	12.57	100.00
2,000,000-2,999,999	1					
3,000,000-3,999,999	1					
	1453	100.0		92,721,260	100.00	

Relation Between Abrasion Loss and Concrete Making Properties of Slag

Abstracted by Edmund Shaw
Contributing Editor, Rock Products

COMMITTEE C-9 (Concrete and Concrete Aggregates) of the American Society for Testing Materals, has submitted a very complete report on the relation between the abrasion loss of slag and its concrete making properties. A reprint, from which what follows has been abstracted, has been published by the National Slag Association as a part of the very complete series of symposiums and reports that the association has issued in the past two years.

The report reviews the work of 1927-1928 by 17 laboratories, including those of the Bureau of Public Roads, the Portland Cement Association, and many state highway departments, on the relation of unit weight to abrasion loss. This investigation did not concern itself with the concrete making properties of the samples tested. But at the same time investigations were made by the Ohio State Highway Department and the U. S. Bureau of Public Roads on the relation of unit weight and abrasion loss of slags to properties of the concrete made from the slags. All these investigations are reported with sufficient detail, the tables of results being given in full, and the final conclusions are drawn from them as well as from the new work.

The new work was an investigation of 20 slags by the laboratories of the National Crushed Stone Association, the France Stone Co., the National Slag Association, the U. S. Bureau of Public Roads, and the Ohio State Highway Department. This work is very fully reported and includes the chemcal analyses and the physical tests of all the slags tested and the methods of making and testing the concrete.

The 20 slags tested were all given this gradation: All pass 2-in.; 27% retained on 1½-in.; 55% retained on 1-in.; 69% on ¾-in.; 90% on ⅜-in., and 100% on No. 4. Local sands were used by each laboratory. Naturally, the strengths of the concrete varied on this account, but the method of figuring the results as percentages of the mean from each laboratory placed all results on an equal basis regardless of the sand that was used. It is to be noted that the actual flexural and compressive strengths were all satisfactory. The 28-day compressive strengths were from 3009 to 4903 lb. and the 28-day flexural strengths from 587 to 755 lb. The mix in all cases was 1:2:3 with a slump between 1½-in. and 2½-in.

The graphs show that there is a general relation between weight per cubic foot and abrasion loss, the higher weights being accompanied by lower abrasion losses. But it is concluded by the committee that "there is nothing in the abrasion test that is not more conclusively shown by the weight per cubic foot determination."

In summarizing the results of all tests the committee kept in mind the specification requirements of 70 lb. per cu. ft. weight and not more than 15% standard abrasion test loss and 24% modified abrasion test loss.

Taking the results in the order presented, the graphs of the Ohio State Highway Department tests show plainly that the compressive strengths of the concretes increased as the weight of the slag from which they were made *decreased*. The figures show an increase from 95 to 105% relative strength with a decrease from 100 lb. to 70 lb. weight per cu. ft. The flexural strengths, however, followed an opposite course, the highest strengths generally being obtained with the heaviest slags. One might draw some interesting conclusions from this as to the part played by aggregates in compressive and flexural strengths if it were not that the other tests did not bring out the same relationships.

The U. S. Bureau of Public Roads tests were all made on slags weighing more than 70 lb. per cu. ft. There was only one that showed less than 90% relative strength and that weighed 87.7 lb. per cu. ft. and it had an abrasion loss of only 11%. Eight of the 18 slags tested gave more than 15% loss by the abrasion test, yet all of them gave satisfactory strengths in concrete, three of them having more than 100% relative strength.

It was concluded from these tests that all slags weighing over 70 lb. per cu. ft. gave satisfactory compressive strengths when made into concrete and that the standard abrasion test is not a measure of the concrete making properties of the material.

The work of the five laboratories mentioned above brings out the same conclusions. Graphs give arrangements according to compressive and flexural strengths. Three slags, Nos. 7, 19 and 13, gave less than 90% relative compressive strengths, and two, Nos. 7 and 19, less than 90% relative flexural strength. These weighed less than 70 lb. per cu. ft., so they would have been thrown out by a specification with this weight requirement. This specification would also have thrown out slag No. 15, weighing just under 70 lb., which gave very good flexural and compressive strengths. Slags Nos. 7 and 19 would have been likewise eliminated by a requirement of less than 15% abrasion loss, but this would also have eliminated slags Nos. 20, 13, 10, 16 and 15, all of which gave satisfactory flexural strengths. The 24% limit of loss by the modified abrasion test would have eliminated Nos. 10, 16, 17 and 1, all of which made concrete with satisfactory strengths. The committee concludes from this that "the weight per cubic foot is the better and more consistent method of determining the quality of concrete which can be expected from various slags."

Wear tests of concrete were made in all three investigations. Naturally it could be shown that the results of the wear test had some relation to both the unit weight of the aggregate and the loss by the abrasion tests. The relationship is fairly consistent and definite in the tests by the Ohio State Highway Department. It is less definite although still evident in the tests by the U. S. Bureau of Public Roads and other laboratories. From the last named tests it is concluded by the committee that: "No definite conclusions can be drawn other than the fact that neither the weight per cubic foot, standard abrasion, nor modified abrasion predicts in any way the wear to be expected in the concrete. Very generally speaking, the concrete containing heavy slags (over 80 lb.) gave the least wear, although the erratic results obtained would indicate that the methods used for making the wear test were not dependable."

The absorptive properties of the concretes were studied in the investigations of the Ohio State Highway Department and of the five laboratories. In both it was shown that the lighter weight slags generally produce concrete having the higher absorptions. From the data given the committee concluded that the abrasion losses "do not conform in any logical way to the absorption of the concrete" and that "the weight per cubic foot is a very good criterion of the results that may be expected from the actual absorption of the concrete."

Plotting weight per cubic foot and compressive and flexural strengths against an ascending scale of abrasion loss led to the conclusion: "That generally the quality of the concrete as indicated by compressive tests is the same as that indicated by flexure tests. That the quality of the concrete is indicated more definitely by the unit weight of the aggregate than by the abrasion losses of the aggregate."

After studying the work of the 17 different laboratories which investigated the determination of unit weights and abrasion losses of slags, the following conclusions, which the report says are "very definite," were arrived at: "That the weight per cubic foot determination is an accurate test which enables any laboratory to check very closely the results obtained by other laboratories.

"That the abrasion test on blast furnace slag is unreliable and inaccurate in that it does not permit other laboratories to check within reasonable limits the results obtained by other laboratories."

The investigations of the five laboratories led to the same conclusions. Checks on unit weight were close, the average mean variation being 2.2%. In the standard Deval test the mean variation was 17.6%. The greatest variation from the average was 72%.

Florida Phosphate Industry Thrives

Mud gun in center and fresh water monitor at right of picture

Normally the two guns throw streams of about the same size

BY FAR the most active rock products areas in Florida are the phosphate fields. Not that an unusually large tonnage is being shipped at present but operators expect normal buying of their products soon and are continuing on an extensive production schedule. The International Agricultural Corp. at its Mulberry plant has spent large sums increasing storage facilities for the undried phosphate rock, having constructed a long overhead trestle, mostly of steel construction, so that incoming cars of pebble from the field may be dumped to ground storage below. A tunnel system below the stock piles with belt conveyors has been provided for reclaiming. Other changes, including the installation of more driers, are now under way. This change from clamshell reclaiming of wet rock is noteworthy and several other producers have already or are going to adopt this system of storage.

Oil Flotation Outstanding

The oil flotation units of the International Agricultural Corp. continue to be the outstanding features of interest in that area and the success of the two pioneer units is shortly expected to bring a drastically different type of washing plant into the phosphate industry.

The American Cyanamid Co. has temporarily stopped dredging at the proposed dock at Tampa, but the United States Phosphoric Acid Products Corp. has gone ahead with a very extensive building program at its acidulation plant near Tampa, having built during the past year a modern contact sulphuric acid plant, dock and storage facilities of unusual magnitude for that district.

This company also continues successfully to manufacture gypsum stucco and tile from the byproduct gypsum from the acidulation plant. It is also marketing hardwall and other grades of plaster made from this same raw material.

Ideas for Gravel Operators

There is much of interest to sand and gravel producers in the phosphate fields, especially those producers troubled with clay balls or soft particles in the aggregate. Most certainly any producer who can visit these phosphate operations with this in mind should by all means do so, for the removal of clay balls from phosphate rock has reached a high stage of efficiency. Especially is this so at the Southern Phosphate Co.'s washer near Lakeland, Fla., where a product containing 85 to 90% of clay balls, all approximately 1 in. to 3 in. in diameter is fed to two Hardinge mills operated in parallel at a rate of roughly 1500 tons per day of 10 hours with the discharge products showing nothing but clean phosphate rock.

These clay balls when wet are very sticky and all the phosphate values contained in the material cling to the outside of the balls, there being practically no values in the interior of the balls, yet the two mills each using only 65 hp. each, are said to break down these clay balls in a manner that is a revelation. When the mills were first installed 3-in. rubber balls with a 1½-in. steel ball for a center were used, as it was essential to break down the clay balls and not decrease the size of the phosphate particles. The rubber-coated steel balls are now used only at times when the disintegration of the clay balls becomes unusually difficult. At present, there are no grinding media in the mills as the clay balls themselves break down satisfactorily.

Stripping phosphate-bearing ground

Log washers are used ahead of the Hardinge mills, but they only act to maintain a uniform feed to the mills and are practically ineffective in breaking down the clay balls. A producer of aggregate troubled with clay balls would learn much from a visit to these fields before attempting any clay ball removing installations.

Developments in Hydraulicking

Stripping and mining of the phosphate-bearing material, when of suitable flowability, continues to be done with the hydraulic monitors, but where the nature of the ground is such that the product does not flow well draglines of large dimensions continue to be used. Bucyrus-Erie and Marion draglines ranging from 6- to 8-yd. capacity are quite common, and are said to have reduced stripping and mining costs to around 3c per cu. yd. Most of the draglines are electrically driven.

In hydraulic sluicing as practiced at the American Cyanamid Co. operations an interesting development has been in use for some time, consisting of a dewatering device that functions to remove a predetermined part of the water from the sludge going to the washer, thereby increasing the solids to liquid ratio of the material being pumped with corresponding savings in power costs. The dewaterer is simply a vertical cylinder located near the discharge of the field booster pump which takes off a part of the top waters in the tank and returns them to a hydraulic "gun." This

method of procedure has the added advantage that it throws a larger volume of water against the bank being washed down than under the ordinary system as practiced in the field.

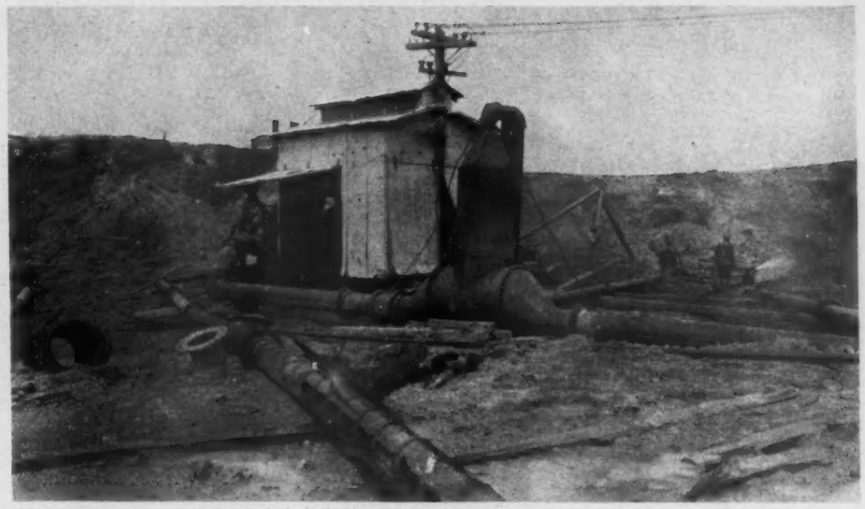
Increased Amount of Solids

At one operation two fresh water hydraulic guns were throwing a total of about 3000 gal. per min. against the bank, which passed to the dewaterer, where roughly 1500 gal. per min. of muddy water was being taken out and returned to the bank by a third "mud" gun making a total of 4500 gal. per min. that was being thrown against the bank. Normally the material going to the washers would have about 10% solids, but under this arrangement a greatly increased percentage of solids is carried.

Large Diameter Discharge

There also seems to be a tendency towards the use of pipe line discharges from the pumps of larger diameter than the pump; for example, a 12-in. pump using a 16-in. discharge line. This has slowed down the velocity of the flow and thereby decreased pumping costs and reduced wear on pipelines. Experiments in the field indicate that the carrying capacity of the water of slow velocity in pipes of large diameter is greater than our textbooks on the subject state. If this is true, it might in a measure be due to the mudding up of water (increasing its specific gravity) which might offset savings in power but would have the advantage of reducing the wear on pipe lines carrying the solids.

The efficient use of pipe lines of large diameter is well worth studying as the average operator in the field uses anywhere from 5 to 25 miles of 8-in. to 24-in. pipe in an operation both for fresh water sluicing where the water is carried under pressure around 200 lb. per sq. in., and for carrying the phosphate material, where much lower pressures are maintained. The application of these experiments to the sand and gravel industry may well be worth looking into.



This dewaterer, working on Florida phosphate, takes water from the top and returns part of it to the sluicing tank

Recent British Sand and Gravel Practice

BRITISH SAND AND GRAVEL PRACTICE seems to need the use of scrubbers more than practice in most parts of the United States, if one may judge from articles in the technical press. One of the British illustrations shows a scrubber of the trough type, something like the familiar log-washer. Apparently it is run with more water than a log-washer. A second washer of the same kind is used to give the material a rinsing. A curious detail of the installation illustrated is that the washer is driven by a three-cylinder water motor, a reciprocating water engine, and the waste water goes into the trough to wash the material.

But the published description seems to show preference for cylindrical washers with blades set in a helix or screw form. The flow of the material is against the flow of water. The cylinder is set horizontally, but the width of the blades varies from 6-in. to a foot so that the water cascades over the blades from the highest to the lowest.

The washed material goes into a set of concrete screens which are cantilever mounted on the end of the washing cylinder. This makes a very compact arrangement. Rollers are used outside the screens to keep them from blinding. The sand is separated in a box with a dewatering elevator.

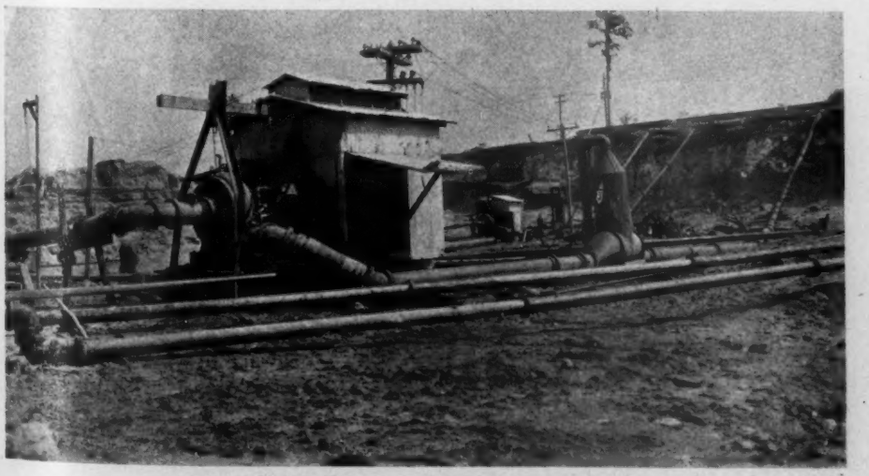
Another article describing one of the newest English plants, that of Trent Gravels, Ltd., gives the tonnage as 75 tons per hour, but the plant has to be of fairly good size because all of the gravel is crushed to ¾-in. and ½-in. This is a dredging plant. The dredge has a steel hull on which is mounted an 8-in. Blackstone "unchokable" pump and a 160-hp. motor. The pump is set below the water line for self-priming.

An odd feature of this operation is that stripping by hand is practiced, although there is only 8- to 12-in. of overburden. One would think that so little overburden could be washed out at much less cost.

The pump discharges into a "boiling-box." Then it passes over a 12-ft. gravity screen which takes out the sand and water. The oversize goes to a "reciprotary automatic feeder" and a 30-in. elevator which raises it to the screens. To keep down the head room the boot of the elevator is placed below the ground level. Two sets of cantilever mounted screens are used with 1½-in. and ⅞-in. perforations in the main sections and ⅝-in. and 3/16-in. perforations in the jackets. The oversize goes to a 40-in. jaw crusher, where it is crushed to ¾-in. and finer. The size between 1½-in. and ⅞-in. goes to a set of 30-in. rolls, and another set of 30-in. rolls takes the size between ⅞-in. and ⅝-in. Both these crush to ½-in. The largest demand is for this ½-in. size.

The plant is a very neat design, steel throughout, including chutes and spouting. The screens are mounted over the bin and the crushers are on independent concrete foundations.

The sand, which is minus 3/16-in., is collected in a square settling tank and removed by a short dewatering elevator.



Typical scene in the Florida phosphate fields

Silo Discharge Feeder

By T. N. Haffner
Keystone Portland Cement Co., Bath, Penn.

THIS METHOD OF DRAWING CEMENT or similar material from bins or silos was originally devised about eight years ago by Howard H. Leh, then superintendent of the Phoenix Portland Cement Co., and the writer, to draw off crushed gypsum from a 300-ton bin and deliver it to a gypsum proportioner. It worked so successfully that a modification was adapted for cement and dry raw material, and three installations (besides the original gypsum installation) have since been put into successful operation.

The "open basement" type of silo or bin is required for its installation. With machinery installed, this type of silo is somewhat more expensive than the older tunnel type, but the additional investment is well warranted by the advantages gained.

Defects of Tunnel Type

The defects of the tunnel type are many. The tunnels are usually made as small as possible, with the screw conveyor standing either on the floor with overhead spouts feeding to it, or the screw conveyor is sunk fairly deep into the floor and fed by spouts over which the operator can step. In the first case a large part of the tunnel advantage is lost, as all the material in the bin below the spout level can only be reclaimed by difficult hand work. In the second case it is unavoidable that the operator walk on the conveyor cover. This is exceedingly dangerous, is not allowed at any other place and it should not be necessary here. In either case the spouts need frequent poking to keep them running and the cramped quarters make this poking difficult. Compressed air is often admitted into the poke holes, coming out of the spouts with the cement, so that one cannot see 20 ft. into the tunnel. Under certain conditions the expansion of the compressed air drops the temperature sufficiently to precipitate moisture, which is absorbed by the cement, forming large dense cakes which must be blasted out.

The working conditions in these tunnels is almost intolerable. Keeping the spouts running requires continuous attention and hard labor and these, together with the extremely dusty atmosphere always present, cause in normal times a very large labor turnover. It is not fair to any man to give him working conditions so nearly opposite to ideal.

The method of drawing off material illustrated overcomes most of the difficulties encountered in the tunnel type of silos and also the troubles incident to the use of separate spouts to the screw conveyor in the open basement type. It is not perfect, for it requires an attendant, although this objection could be partially overcome by the use of a good automatic feeder. This feature is usually omitted because of the high cost of separate feeders for each bin, and the undesirability of a traveling feeder because of frequent changes of bins due to shipping tested cement. In one installation, built about six years ago, provision was made by the writer to install such a feeder at some future time. In this case it has not been done to date, and it is a fair guess that it never will be.

The feeder illustrated consists of a number of chutes, preferably four, widely separated where they are connected to the bin bottom and coming to a common point. A rack-and-pinion gate controls the flow at this point and delivers the material to the screw conveyor. Slide gates are provided at each chute connected for use in shutting off the flow in the case of repairing the feeder.

As the material enters the chutes at four separate points, any one of which will pass as much material as the screw conveyor can carry, a stoppage of the flow is almost impossible. Any arching in the bins over two or even three chute openings is soon broken down by the flow through the remaining chutes, and it is only in the rare case of the material forming an arch over the whole bin that the flow is stopped.

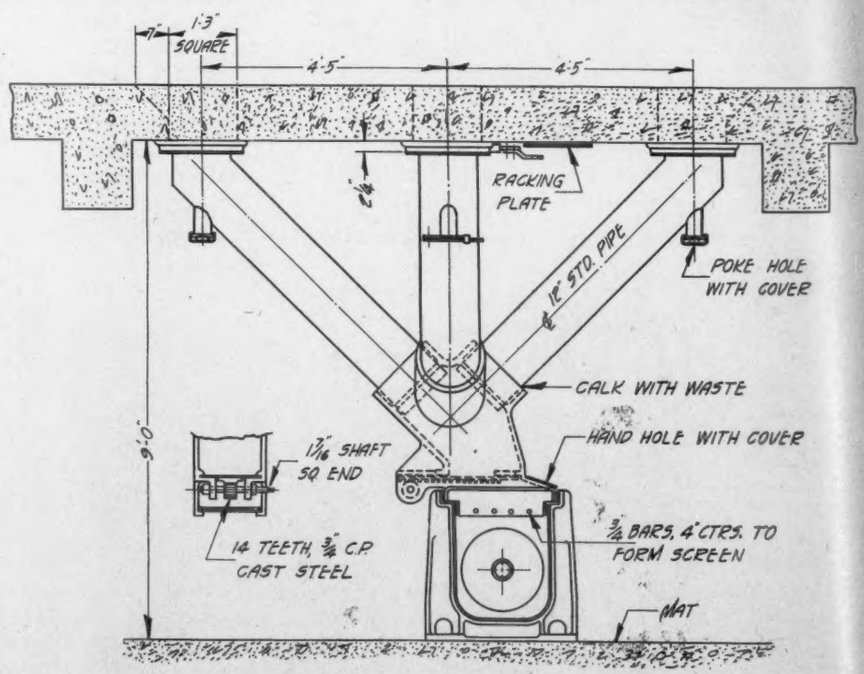
The slide gates at the bin bottoms are of cast-iron, heavy, and compressed into a space of 2¼ in. The racking plate bolted to the bin bottom is wide enough for the holding bolts to clear the slide when it is withdrawn. This method of closing the slide is somewhat slow, but this gate is so infrequently used that this is of no consequence. No upper guides are provided for the slide except at the outer end.

The chutes are made of 12-in. standard weight pipe; 10-in. pipe has been used with fair satisfaction, but 8-in. is definitely too small. The 12-in. pipe will pass any reasonable size lumps of caked material and need be "poked" but seldom, if ever. Naturally, the smaller the pipe the more frequent will be the poking. Standard pipe wears indefinitely, and special provision to facilitate renewal is not justified.

Poke Holes

The poke holes are short lengths of 3-in. pipe welded at the upper end to the chute pipe, and covered at the lower end with a welded rectangular piece of ⅜-in. plate with a 1-in. hole in it. A 2x⅜-in. flat, bolted at one end with a bolt and spacer, and held with a light guide at the other, is easily moved to cover the 1-in. poke hole, or to uncover it to admit the poke rod. The expenditure for the poke holes has justified itself. They work easily and there is a minimum of mess to clean up after using them. While these poke holes are very seldom used, it is well to remember that they are exceedingly useful when they are.

The main gate body is of cast-iron. The gate opening is 12 in. wide by 15 in. long, with two corners of the opening closed up, so that the first 8-in. of gate opening is a trapezoid. Fine material flowing through a narrow slit clogs very easily, and once started is very likely to flow with a rush. By closing the corners of the opening a more nearly square hole is obtained, with



Type of silo discharge feeder installed by the author

only a small area of opening, and the stream kept under the best control, especially when passing small amounts of material. The slides are made of ½-in. steel plate for stiffness, finished on two edges and with the corners rounded. For easy movement, no upper guide is provided except at the outer end, there being no upward pressure to render this objectionable. A cast-steel rack with ¾-in. pitch cast teeth is riveted to the plate. A coarse screen is formed about 8 in. below the slide by ¾-in. round bars dropped into cast pockets, to catch large lumps of caked material. A removable plate cover is provided to take out or break up these lumps. Holes with covers are also provided to clear out the chutes, but these seem to be of no value, as they are never used with 12-in. chutes.

Operator of Gate

The main gate is operated by a 14-tooth steel gear on a 1 7/16-in. shaft in babbitted bearings cored into the main body casting. Both shaft ends are squared for removable ratchet wrench, both for smaller clearance required as compared to a hand wheel, and also for ease of operating. The wrenches are 20 in. long and can be moved by the operator to the point where it is most convenient to grasp them, whereas a wheel is fixed, and requires an awkward position of the wrist in turning it. Also, no one would install a 40-in. wheel, which equals in lever arm the 20-in. wrench. Only a few of these are required in a large silo basement.

The main gate body rests directly on the screw conveyor trough. This may be considered objectionable, as the sections of screw cannot be lifted directly out of the trough, but must be moved lengthwise first. There should be no difficulty in supporting the gate body from the floor and discharging into the side of the trough if this demanded. It is desirable in such a case that the side of the screw nearest this opening travel downward, to cause as little obstruction to the flowing material as possible.

Adjusting Length of Chutes

Some method of adjusting the length of the pipe chutes must be used to allow for the variations in the concrete work. An inch or even two seems to be of no concern at all to the concrete silo contractors. In the installation described, the holes in the main casting were ¾ in. larger in diameter than outside diameter of the entering pipe, except a ring 1 in. wide 3 in. from the edge. Waste was calked into this opening after assembling. Hair felt ½ in. thick was used for dust-tightness at other points.

Getting finished material out of storage for shipment is essentially a part of its selling, and selling brings in the money. In most of the other processes of manufacturing and handling materials like cement a certain amount of "slack" can be taken up in some way or other, but when cars are waiting to be loaded for impatient buyers the machinery should work to get the product into them immediately. Blasting out cement caked over openings by using compressed air having spouts and gates just a little too small, or not being able to open a gate because the cast-iron gears have "broke" may be disastrous, and are most certainly poor economy.

Short Time Tests of Portland Cement Held Unreliable

IN BULLETIN No. 25 of the Maine Technology Experiment Station, H. Walter Leavitt and John W. Gowen apply statistical methods in a study of short-time cement tests. The world, they say, is shouting for a 1-day, 2-day or even 3-day test of cement, because there is an economic loss in waiting longer periods of time. But these writers find that only the 7-day test will give a reasonably reliable prediction of the 28-day strength.

Their studies showed that the relation of one briquet to another molded from the same batch of cement was high. Taking an exact correlation as 1.00, the relation for 1-day tests was found to be 0.897; for 3-day tests, 0.760; for 7-day tests, 0.981, and for 28-day tests, 0.902. These results were from testing 150 cements with three briquets, standard 1:3 mix, made from each sample. They show a practical check at all ages for the same cement. The 3-day test was the farthest out of any, and the reason for this has not been found.

But when the 1-day and 28-day strengths of all cements were plotted in the ordinary scatter diagram no such correlation was found. The correlation ratio was found to be 0.322, which means that the 1-day strength of any cement has about one chance in three of reasonably predicting the 28-day strength. The 3-day and the 7-day tests were plotted in the same way. With the 3-day test the correlation coefficient was 0.395 and with the 7-day test, 0.734. With the 7-day test relationship to the 28-day test is almost as close as between briquets made from the same cement in three days, as shown above.

The results on the 7-day test were better than those found previously by the same investigators on 711 samples of cement and reported in their Bulletin No. 15. The coefficient in this case was 0.654. Testing 185 samples from the same manufacturer, all bearing the same label, they obtained a coefficient of 0.638. The reason for a higher coefficient in the present study, in their opinion, is due to better laboratory technique and also to a more uniform quality of cement.

These writers say that there is a tendency to adopt short-time tests without studying their reliability. The rush and hurry of the age demand immediate information as to the suitability of a cement for use. But they believe that until authentic data can be produced to show that the 28-day period is not the proper limit for acceptance of a cement the old standard should be maintained.

Much Interest in Indiana in Mineral Wool

THE AMOUNT of raw materials in Indiana warrants further development of an industry to manufacture mineral wool, according to Dr. W. N. Logan, state geologist, in a report to Richard Lieber, conservation director.

It is one of the most important rock products of the state and this mineral wool serves many purposes, Dr. Logan said. One of its principal uses is in the manufacture of insulating materials used in the construction of refrigerators; insulation of steam pipes, for filtering purposes, and especially valuable in filtering acids and gases of a corrosive character. It likewise is valuable packing for glass containers filled with acid. In building, it is used to deaden sound, prevent the entry of mice and rats in partitions and beneath floors and as an attic covering. It may be used to destroy mechanical vibration. As an insulating material it is further used in the construction of fireless cookers, stoves and ovens, and for tanks used for melting wax, asphalt and other substances.

Large quantities of the raw materials used in the manufacture of mineral wool are obtained from rocks of the Silurian age and found in northern Indiana. Factories are at Alexandria, Yorktown and Wabash.

A rock of similar composition is found in southern Indiana and has been used in the manufacture of mineral wool in two small experimental plants, one located near Salem, in Washington county, and the other near Campbellsburg, in the same county. Dr. Logan expects extended development in this industry, he informed the conservation commission.—*Indianapolis* (Ind.) *Star.*

Washington State Asbestos Plant Active

JOE H. FORMAN, Mt. Vernon, Wash., newspaper man, has accepted a position as sales manager of the Asbestos Talc Products Co., of Burlington, it is announced. Although much of his time will be spent in Seattle and other state points, Mr. Forman said he would retain his home in Mount Vernon for the present.

The Burlington asbestos mine started producing last September and since that time, about 50 tons have been sold. Work at the mine was resumed April 1 after a three-month layoff for repairs.

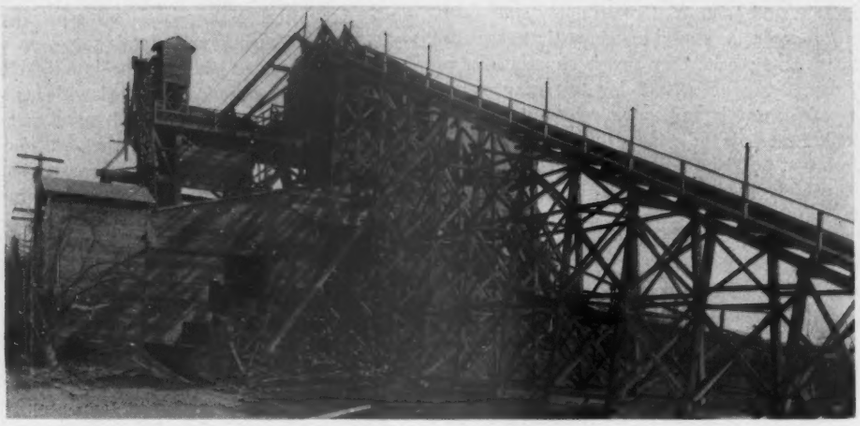
Seven different products will be turned out by the asbestos plant this year, Mr. Forman said. This includes boiler cement, three forms of asbestos for roofing purposes and a compound used in walls for deadening sound. The milling plant of the company is located on Cherry Street in Burlington, while the mine is at the east end of the hill.

Dr. W. L. Jackson of Burlington is president of the company and C. R. Buck of Mount Vernon is secretary-treasurer.—*Mt. Vernon* (Wash.) *Daily Herald.*

Developments in Oregon Sand and Gravel Industry

A News Letter from the Pacific Northwest

By W. A. Scott
Portland, Ore.



Clackamas River plant of Oregon City Sand and Gravel Co.

A NEW PLANT for the production of mineral aggregate, situated on the Clackamas river, in Oregon, was placed in operation late last summer by the Oregon City Sand and Gravel Co. Its site, on the right bank, is about 300 yd. above the outlet into the Willamette. The location affords ready access to a valuable deposit of clean material, consisting of sand, gravel and round boulders in the center of the river. This appears as an island deposit, about 200 ft. wide and 1800 ft. long, which divides the stream in two channels. Initial excavations were made to a depth of 35 ft. without reaching bedrock. This testing demonstrated also that the deposit carried a low percentage of silt and soil.

The Clackamas is a rather swift-flowing, mountain stream, and the deposit just above its mouth is the result of a continuous movement of material along its course, beginning at its sources in the Cascade range. This movement and redeposition no doubt serve to replenish the supply. It is estimated that this deposit, from which material for the new plant is derived, carries close to 15% sand, 50% gravel and 35% boulders of the maximum diameter of 10 in.

While a comparatively small plant, it has some features of design that contribute to economy in the handling and classification of material, and likewise as to the storage of products and the loading of delivery trucks. The processes involve the recovery of material from the deposit, its delivery over an incline to the head of the plant, wet-screen classification of sand and gravel, three stages of crushing for 3-in. to 10-in. rock and the grading of the rock products by dry screens.

Drag Scraper Operations

A Sauerman 4-yd. drag scraper is used to bring up material from the river deposit and dump it at the river bank near the plant. This is operated by a Willamette double-drum, steam hoist that carries a 1-in. inhaul cable and a ¾-in. backhaul line, covering a span of 550 ft., extending across the first channel and to the farther edge of the deposit. In this operation the backhaul cable extends from the hoist to the tail tower as a skyline. The tail tower and its anchorage, of course, are moved when necessary to extend the scope of excavation.

The loaded scraper is drawn up the low bank of the stream where the material is dumped over a 10-in. grizzly, the undersize discharging through a feed hopper into a 4-yd. car that runs over a track of 36-in. gage. This track extends 200 ft. up a 35-deg. incline to the top of the plant building. A 4-yd. car operated by a single-drum hoist, driven by a Westinghouse 50-hp., belt-connected motor, delivers the material to a receiving hopper at the head of the screens at the rate of 60 cu. yd. per hour.

The initial phase of grading consists of separating the river-run material into two streams. The first, comprising gravel and sand, passes by gravity to a set of wet screens; the second, consisting of all rock exceeding 3-in. size, leads into a chute that discharges into the feed bin over the primary crusher.

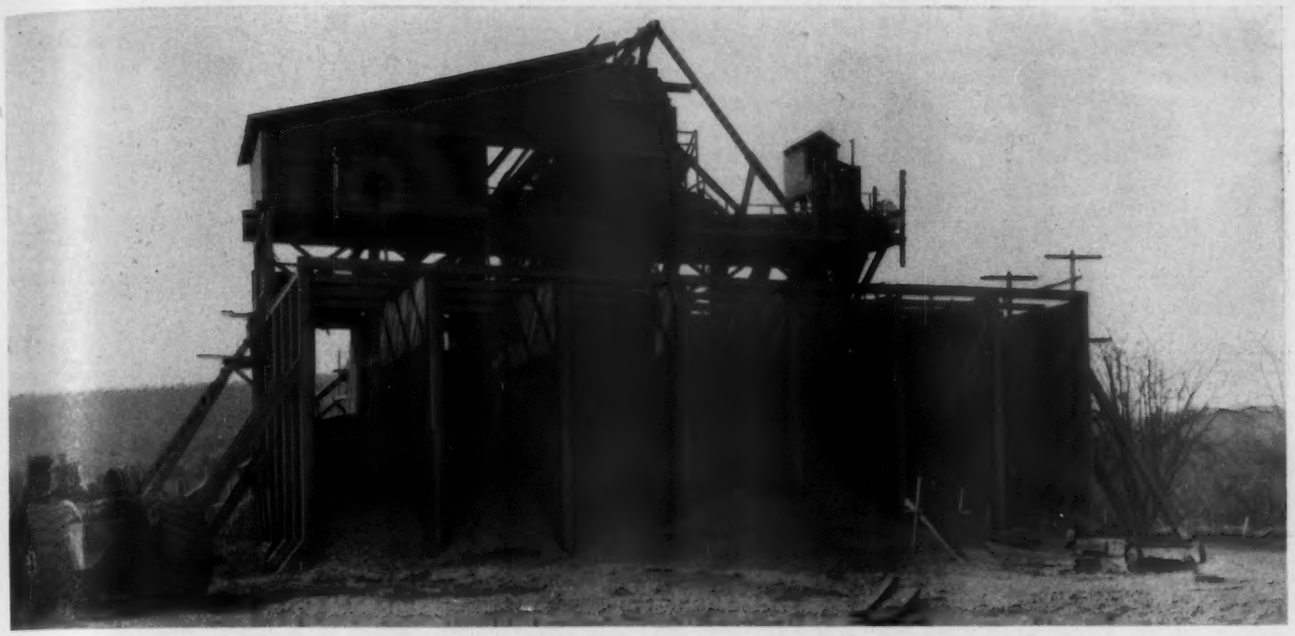
In detail, the material is discharged from the receiving hopper into a 12-ft. by 48-in. scalping screen. Its oversize, running 3-in. to 10-in., passes to the crushers; the undersize, of 3-in. minus, is fed through a chute into an Allis-Chalmers revolving screen for washing and classification. This product comprises sand and three grades of gravel—3-in., 2-in. and 1-in., all of which are spouted down to the storage and shipping bins for those grades. The water for sand and gravel washing is delivered to this screen through a 4-in. pipe by an American centrifugal pump, driven at 1800 r.p.m., by a General Electric 30-hp. motor.

The Three Crushing Units

The plant is equipped with one primary and two reduction crushers for rock of all sizes from 10-in. down to 3-in. The three crushers are so aligned on an incline as to provide for gravity feed from one to another. The primary is a Universal 36-in. by 15-in. jaw crusher, which is driven at 200 r.p.m. by a 50-hp. motor of the speed of 1200 r.p.m., the 8-in. dia. motor pulley being connected to the 36-in. crusher pulley by a rubber belt that runs on 30-ft. centers. This crusher reduces the rock to minus 4-in., the product passing by gravity to a Clyde Equipment Co. shaking screen of 2-in. openings. Its undersize feeds into an inclined chute by which it is delivered into the boot of a bucket elevator. The Clyde screen oversize is reduced by a Wheeling 9-in. by 36-in. jaw crusher, driven by a 20-hp. belt-connected motor, its operations being stabilized by a flywheel. Its 1½-in. product is classified by a revolving dry screen of ¾-in. perforations. The oversize is passed to a Symons 24-in. disc crusher by which it is reduced to ¾-in. minus. The disc product and the screen undersize are fed into the boot of the bucket elevator previously mentioned.

Elevator and Rock Screen

The elevator, equipped with 7-in. by 14-in. buckets, Link-Belt type, running to a height of 50 ft., carries the unclassified crushed-rock product to the dry screen, above the rock-storage bins. This, the only elevator in the plant, is operated by a 15-hp. motor through a chain transmission belt.



Storage bins, with reclaiming tunnel below, at plant of Oregon City Sand and Gravel Co.

The revolving dry screen, of Hesse-Ersted manufacture, Portland, has a diameter of 40 in. and a length of 18 ft. It classifies the crushed rock in three sizes of 2-in., 1½-in. and ¾-in., which are chuted to the three crushed-rock bins.

On the screen floor, near the top of the building, is a 20-hp. motor, connected by a rubber belt to a main drive shaft, from which the wet and dry screens are operated separately through sprockets and chain belts. The horizontal chain drives on the two screens cover transmission distances of 15 and 18 ft. respectively, the speed reduction for each unit being governed by the sizes of the sprocket wheels.

Storage and Shipping

Storage for all grades of products is provided by seven timber-constructed bins, each 12 ft. wide, 26 ft. high and 40 ft. long. They are designed, however, for extensions to a length of 100 ft. to provide greater capacity. These bins, in longitudinal dimension, run at right-angles to that of the mill building.

A concrete-lined driveway, 12 ft. wide, 11 ft. high and 100 ft. long, cuts transversely under the head ends of the bins, which are below the wet and dry screens. Two gate-controlled loading chutes extend down from the head end of each bin through the tunnel roof. Under this arrangement, the delivery trucks are driven into the tunnel, loaded with material of any specified grade, and then driven out at the opposite portal.

Shifting of Stock in Bins

Equipment has subsequently been installed for shifting the material in any bin from the head end to the opposite end, or the reverse, with the idea of using the rear half for reserve storage, and of utilizing the same means for moving it toward the loading end of the bin when required. This equipment consists of a 1-yd. drag scraper, operated in one bin at a time by an electric hoist and cable. The hoist, at the rear end, outside the bin, will drag the loaded scraper in either direction the full length of the bin. The electric hoist is moved on a track, outside the bins, by a trolley line, so it may be adjusted to operate the drag scraper in any bin desired.

F. P. Morey, president and manager for the company, prepared the plans and general layout, and the construction and installations were under his supervision. P. G. Jones, as plant superintendent, has charge of operations.

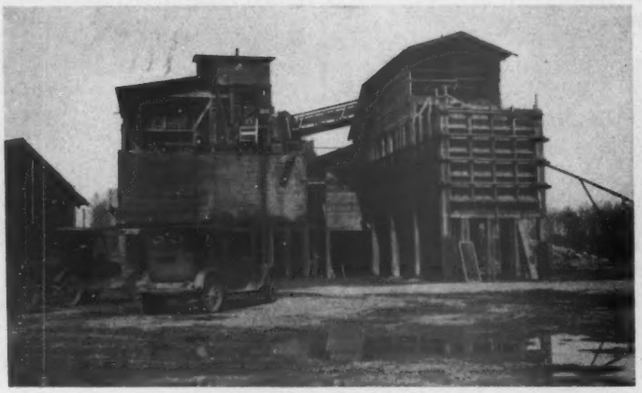
The property is close to the Pacific highway and for the first year or two all products will be delivered to consumers by motor trucks. But provision eventually will be made to make some shipments by barge down the Willamette river to Portland, a distance of about 10 miles. Another feature contemplated by Mr. Morey is the construction of a central concrete mixing plant on the grounds adjacent to the stock bins.

* * * * *

Producing Aggregates on the Upper Willamette River

The Springfield Sand and Gravel Co., Inc., operates two plants, two miles apart, on the

Plant of Eugene Sand and Gravel Co., Eugene, Ore.



Screening plant, bins and stockpile of Eugene Sand and Gravel Co.

Willamette river, in Oregon. One of them, which has been in operation six years, is in Springfield. The other, known as the Inter-City plant, is situated on the Pacific highway, between Springfield and Eugene, the two cities being four miles apart. The combined capacity of the two is about 375 cu. yd. per day.

The Inter-City plant is of the greater interest because it was recently rebuilt and newly equipped, following the destruction of the first plant by fire in July, 1930. Material for the new plant, running from fine sand up to 8-in. cobbles, is taken from a river deposit with a Bagley 1½-yd. drag scraper, operated by a 75-hp. electric hoist. It is dumped into a hopper and then feeds into a 1-yd. skip, the latter being drawn up a 60-deg. incline by a 10-hp. hoist.

The skip discharges at the head of the incline into a conical, double-jacketed washing screen of the Dull type, furnished by Link-Belt Co. The inner and outer screens have 3-in. and 1½-in. openings respectively. The inner-jacket oversize material, from 3-in. to 8-in., passes into a chute that leads to the crusher. The inner-screen undersize and the outer-screen oversize give products of minus 3-in. and 1½-in. That which passes the outer screen, running from minus 1½-in. to fines, is carred by an inclined chute to a second conical screen of the same type. This has ¾-in. and ¼-in. inner and outer-screens, with a short ⅛-in. wire-mesh sand jacket. Thus, the products of the two conical screens consist of 3-in., 1½-in., ¾-in., ¼-in. and ⅛-in. However, the ¼ to ⅛-in. material passes through a sand washer. Water required for the conical screens and sand washer is supplied by a Fairbanks-Morse centrifugal pump that makes a 65-ft. life through a 3-in. pipe line.

Primary and Secondary Crushing

The gravel and cobbles, 3-in. to about 8-in., rejected by the first conical screen, pass to an Austin No. 103 gyratory crusher, driven by a 50-hp. motor. This reduces the material to 1-in. and less. The product is further reduced by a Symons disc crusher. The crusher product is elevated to a belt conveyor by which it is fed on to a Link-Belt vibrating screen, set at a 30-deg. incline. The resulting dry-screen products are 1¼ to ¾-in., ¾ to ⅜-in. and ⅜-in. to 10-mesh. These are specially adapted to road work.

The Springfield plant, in some respects, is similarly equipped, except as to crushing and dry screening. For the latter work there is a Traylor gyratory crusher, a set of reduction rolls and a long, revolving screen.

This company has an order to supply 18,000 cu. yd. of graded material to Frank Kiernan, who has a state contract for placing non-skid surfacing on 54 miles of the Pacific highway between Eugene and Wilbur.

Those in control of the two sand and gravel plants described herein are Sig Moe, manager; Kenneth Chase, and Clarence and Ernest Nelson. Both plants will be operated this year.

* * * * *

Sand and Gravel Production at Eugene, Oregon

The plant of the Eugene Sand & Gravel Co., situated on the left bank of the Willamette river, at Eugene, Oregon, was built about five years ago. It succeeded the company's original plant, previously operated at another site on the same stream. This modern plant, equipped for an 8-hour production of 350 cu. yd., has been continuously operated since the date of its completion. Its output is marketed in the upper half of the Willamette valley, and in territory contiguous thereto. The demands are for highway and street paving, crushed-rock surfacing, concrete building and dam construction, and for the manufacture of concrete products. Some material for railroad ballast is also supplied.

The plant and yards occupy a level area of ground a few feet above the river's high-water level. The deposit of material, running from fines to 10-in. boulders, covers much of the stream bed. This is recovered by a drag-scraper outfit, comprising a Willamette motor-driven, double drum hoist, that operates a Sauerman 2½-yd. drag-bucket by means of 1600 ft. of 1-in. inhaul cable and 3500 ft. of ⅞-in. backhaul line. The digging at present is on a river bar that extends about 1400 ft. up and down stream, but lying rather close to the left bank. The backhaul line extends from the drag-bucket over the tailblock which is attached to a 1200-ft. deadman cable that stretches across the stream at the upper end of the deposit. This tail block, near mid-stream, can be moved in either direction along the deadman line in order to extend the area of excavation. The backhaul line then extends 200 to 300 ft. from the tail block to the lead block on shore, and thence about 1600 ft. overland to the hoist, the latter section being carried above the surface on blocks attached to trees.

The drag-bucket dumps the material at the river bank into a hopper that discharges into a 1-yd. skip, the latter being operated over a 75-ft. track on a 60-deg. incline. The skip dumps its loads at the head of the incline into a hopper. Thence, the river-run material passes into a spout from which it is washed through a series of Link-Belt Co. revolving, conical screens of the Dull type.

The first of the series has 3-in. openings; the second has 2-in.; the third having 1½-in. perforations, with a ⅛-in. sand jacket over the lower half. In this type of screen, as is generally known, the lower end is closed. The oversize in each case is washed out at the feed end, the undersize passing either to the next screen or to a bunker compartment. In the case of the head screen in this plant the oversize, running from 3-in. to 10-in., is washed into a chute that leads to the rock bin over the primary crusher. The operation of the three conical screens results in several aggregate sizes from 2-in. down to pea gravel and sand. The last named is washed through a sand settler for grading.

Crushing and Classifying

The Universal jaw crusher, which is driven at a speed of 255 r.p.m. by a 45-hp. belt-connected motor, is operated exclusively on the 3-in. to 10-in. material that constitutes the oversize from the head conical screen. This crusher product, which runs from 2-in. to dust, is carried to a height of

22 ft. in a bucket elevator by which it is delivered to Russell shaking screen No. 1. This makes the following six grades: 2 to 1½-in., 1¼ to ¾-in., ¾ to ½-in., ½ to ⅜-in., ⅜ to ⅛-in and ⅛-in. to dust.

There is, however, a Russell shaker oversize screen which feeds by gravity to a Symons 24-in. disc, the product of which is further reduced by a Symons set of 18-in. rolls. This recrushed material is carried by a second bucket elevator to Russell shaking screen No. 2, which produces these grades: 1 to ¾-in., ¾ to ½-in., ½ to ⅛-in., ⅛-in. to dust.

The foregoing shows three sources of finished products—the conical screen series, Russell shaking screens No. 1 and No. 2, all of which involve wet processes. The three classes are unusually clean products. In fact, the material in the river deposit carries but a limited amount of waste.

Production during the winter, when the demand is light, results in a large stock of the numerous grades in excess of the bunker capacity. The separate grades of this excess supply are regularly drawn from the bunker compartments into trucks and piled in the spacious yards around the plant. Two truck cranes are utilized in placing the material in compact stock piles; and during the active marketing period these cranes serve for loading from the stockpiles into delivery trucks.

The principals in this company are J. R. McKy and H. B. Ruth, the former being president and manager. R. F. Russell is plant superintendent.

New Eau Claire Gravel Plant to Be Ready Soon

A NEW SAND AND GRAVEL washing and screening plant, embodying all the latest features in this industry is being erected by the Eau Claire Sand and Gravel Co., Eau Claire, Wis., on the south bank of the Chippewa river about halfway between the Shawtown bridge and the Milwaukee railroad bridge.

The new plant is close to half a mile due north of the old plant of the company near Highway No. 37-85, which was destroyed by fire last August.

The new plant will have about four times the capacity, it is said, of the plant destroyed by fire, or 50 carloads a day. It is planned to have it completed by May 1.

Most of the construction will be of structural steel and concrete, part of the structure rising as high as 50 ft.

According to A. O. Ayres, president of the company, it will be one of the most up-to-date sand and gravel plants in the northwest.

The company operates another plant on the Chippewa river, a short distance south of Chippewa Falls. This is a larger capacity plant than the one under construction here, with a daily capacity of 100 carloads.—*Eau Claire* (Wis.) *Telegram.*

To Determine What Construction Labor Wage Scales Are

LOCAL WAGE SURVEYS to provide accurate data as to the range of pay prevailing for the building trades and labor in every community in the United States, to be conducted by the Associated General Contractors of America in co-operation with its more than one hundred chapters and branches, were planned by the executive cabinet of the association at a meeting in Washington, D. C., recently. A canvass of the local groups of contractors is to be conducted at once to determine if accurate wage data can be compiled.

The surveys would be made to enable general contractors to arrive at some conclusion as to the actual prevailing wage that they must pay on government construction work under the new Davis-Bacon Act and to fortify them against charges of violation of this law.

The decision of the executive cabinet, which is headed by A. P. Greensfelder, of St. Louis, president, is taken as an indication that organized general contractors have no intention of passively submitting to arbitrary decisions as to what constitutes the "prevailing rate of wage" in a given community under the new law, which places final decision with the Secretary of Labor.

"The purposes of this new act are laudable and have the hearty endorsement of responsible general contractors," Mr. Greensfelder said, "but in their anxiety to push the bill through, its authors left weaknesses that seem certain to work injustices on the contractor or else make the act itself ineffective."

It has been the contention of the Associated General Contractors that the law should provide, or be so administered, that the rate of wage on a government project in a given community would be predetermined by the contracting officer and stipulated in the contract or specifications.

"These recommendations, the wisdom of which seems at once apparent," Mr. Greensfelder said, "were ignored by congress in its frantic last-minute rush to enact the Davis-Bacon bill and have subsequently been studiously avoided by those who will have charge of administering the law."

Mr. Greensfelder pointed out that without a predetermination of the wage that must be paid, contractors will be bidding in the dark and gambling on the ultimate cost of a major factor in the construction of a project. Responsible contractors, therefore, are left the alternative of either withdrawing entirely from competition on government work, or else obtaining, through private survey, accurate wage data that will stand up in the courts, he said.

Those attending the executive meeting include in addition to President Greensfelder: A. E. Horst, of Philadelphia; Col. George B. Walbridge, of Detroit; Alan Jay Parrish, of Paris, Ill.; David J. White, of Boston; Richard Hopkins, of Albany, N. Y.; Thomas J. Baker, of Milwaukee; Burt L. Knowles, of Worcester, Mass., all nationally known general contractors; and Edward J. Harding, of Washington, managing director of the association.

Ferrysburg, Mich., to Have Another Gravel Plant

THE TOM JOHNSON GRAVEL CO., Grand Haven, Mich., announces the purchase of 132 ft. of water frontage in Ferrysburg north of the Johnston Boiler Works, to accommodate additional business during the coming year. The property includes two lots owned by the Cournyer estate and the sale was made through James W. Oakes and company. A dock is being built along the water frontage where scows from the beds at Bass River may be unloaded and the gravel shipped to northern points. The company is now furnishing gravel for construction of the Fruitport school and to a number of Muskegon customers.

In addition to its new holdings at Ferrysburg, the Tom Johnson Gravel Co. will continue to operate a dock at the foot of Franklin Street in this city where a new screening hopper has been installed during the winter. Dredging and hauling of gravel started April 1 at Bass River. The company operates nine scows and a tug, the *Senniece,* and for water shipments on Lake Michigan, will charter the big gravel carrier *Fred W. Green.* The tug *Senniece,* incidentally, was built and launched in Grand Haven at yards on the South channel ten years ago and is the last vessel built here.

Last year the output of gravel by this concern was 75,000 tons and 15 men were employed by the company. The company owns enough holdings for a 30 years' supply. The Tom Johnson Gravel Co. is a partnership owned by Tom Johnson and Capt. Duncan McDonald. Both are pioneers in the gravel business, Mr. Johnson having formerly been associated with Capt. Isaac Van Weelden. The present firm was formed in 1921.—*Muskegon* (Mich.) *Chronicle.*

To Develop Arkansas Barite Deposit

DEVELOPMENT of what is believed to be the world's largest deposit of barite, located 12 miles southeast of Hot Springs, Ark., will begin immediately with the erection of a $200,000 mill, it has been announced.

The deposit, estimated at 15,000,000 tons, was discovered by Moritz Norden, a California mining engineer. Shipment of crude product from the deposit is expected to begin within ten days.

The mill, to be in operation within three months, will provide employment for several hundred men.

What Is a Specification Engineer for a Producer?

Answered by One

By Harry D. Jumper

Specification Engineer, Consolidated Rock Products Co., Los Angeles, Calif.

THERE IS, no doubt, a question in the minds of some of the readers of my article, which was published in the April 12 issue of Rock Products, a year ago, as to what the duties of a "specification engineer" are, and his relationship to the different departments which make up a large aggregate production company.

Usually a specification engineer would be thought of as one who has charge of writing specifications, but in my case it is one of dissecting and interpreting those written by others, and determining whether the standard materials produced by us will comply with these specifications, or whether it will be necessary to make certain plant and screen changes, and, if the latter, what it will cost.

Co-ordinating Sales and Production

The above work calls for a very close co-ordination between this office and the sales department, so that the necessary information on jobs of any size is brought in. When prices for materials are to be quoted, the salesman obtains from the contractor a copy of that portion of the specifications pertaining to the aggregates. These are brought to this office and studied, after which a memorandum is attached, and the data sent back to the sales department, where is given the name of the material that will meet the specifications. In case no material is produced by us which will meet the requirements, this office then confers with the engineer or architect responsible, giving him the screen analysis, etc., of the material closest to his specifications, and endeavors to get this accepted. If this cannot be done, we then give the sales department the added cost of this special material so it may quote prices accordingly.

We also handle all testing of materials produced by us for our own records and research. To accomplish this, a testing engineer is employed who has a portable testing laboratory, that is taken by him to the various plants or jobs where trouble with material is being had. The various materials produced by us are sampled and tested for screen analysis, dust content, silt and clay determinations, void content and fineness modulus, specific gravity, weights per cubic foot, etc. These tests are being made continually and the chart attached hereto and marked Fig. 1 is a sample of the record kept by us on each material produced. From this record we are able to keep, by means of slight changes in the meshes or perforations in screens used at the plants, a very uniform grading. This is readily seen by noting the uniformity of screen analysis shown on the chart.

It might be well to give an idea of the research necessary to bring about this standardization of materials at the various plants which are located in three distinctly different deposits, one being located in the Big Tujunga Cone in San Fernando Valley, about 25 miles northwest of the metropolitan district of Los Angeles. Another one is located in the San Gabriel Cone, 25 miles northeast of Los Angeles, and another on Sandiago Wash in Orange county, about 50 miles southeast of Los Angeles. The raw material from these deposits differs greatly as to screen analysis, and it has been necessary to study methods of screening and classifying these materials at each individual plant, thus making changes in perforations and meshes, or changing the thickness of screen plates, or the diameter of wires used, and in some cases the speed of screens to bring about this uniformity of products.

Pass on All Screen Installations

In order to safeguard against an error in the renewal of the established screens in use at the plants, all requisitions for new screens must come to this office to be checked and passed on before being sent to the purchasing department.

Other work carried on by this department is the education of our plant and bunker men in the value of clean and well graded materials by being sure not only that the plant product is good, but also that the carriers in which the material is to be transported are clean, and also impress upon them the value of all this from a sales standpoint.

During the past few years the movement for higher type highway and building construction has taken rapid strides in this section. Engineers have been making careful studies in design, and have carried on extensive tests in order to prove or disapprove their theories, thus enabling them to arrive at some definite determination. We have been glad to keep in step with this movement, and we have found that the producing of premium aggregates, so to speak, is doing our business considerable good.

Working with the Users

While the engineer, in most cases, cannot definitely specify the product of any private individual or company, he is, however, in a position to cast considerable influence over the contractor or party who is to purchase the material, which has its resulting effect. Knowing this to be true, we have made an earnest endeavor to co-operate with the

Editor's Note

HERE is a notable example of how a "specification engineer," working for a producer of aggregates, can co-ordinate the production and sales departments, cultivate the goodwill of users, and promote the use of a quality or "premium" product.

This involves, as the reader will see, first of all a thorough knowledge of what the raw materials are, and, second, how they may be graded and prepared to the best advantage of both user and producer.

Another and important service rendered is the education of the plant operating men in the sales value of clean and properly prepared aggregates—something very, very often overlooked.

—The Editor.

MECHANICAL ANAYSIS OF MATERIALS
(Consolidated Rock Products Co., October, 1930)

Gravel No. 3

Plant	No.	1¼ in.	1 in.	¾ in.	⅜ in.	¼ in.
Alameda	1	99.5	90.0	71.0	12.0	2.0
Arroyo Seco	2	99.0	92.0	68.0	14.5	1.5
Durbin	3	98.0	89.0	74.1	16.5	2.0
Baldwin Park	4	98.0	90.0	72.0	15.0	2.0
Reliance	5	100.0	92.0	65.0	18.0	2.0
Irwindale	6	100.0	89.0	68.0	21.0	1.5
Builders	7	99.0	89.0	71.5	19.5	2.0
Kincaid	8	100.0	90.0	73.0	21.5	2.5
Rivas	9	100.0	89.0	71.0	19.0	2.0
Largo	10	100.0	92.0	73.5	21.0	1.5
Claremont	11	100.0	91.0	70.5	23.0	2.0
Orange Co.	14	98.5	90.0	72.0	20.5	1.5
Brush Canyon	21	.....	.....	.....	.....	.....
Roscoe	22	100.0	96.0	69.0	29.0	2.5
Hewitt	23	100.0	97.0	76.0	24.0	2.0
Sheldon	24	100.0	96.5	65.0	19.0	1.0
Penrose*	25	100.0	88.0	68.0	19.0	2.0
Big T	26	100.0	95.0	75.0	25.0	1.0
Boulevard	27	100.0	96.0	68.0	18.0	1.5

*Unwashed material.

Fig. 1. Typical report on material

engineers in their experiments, and have rendered them any assistance we have been able to give.

During the past year the specifications for asphaltic concrete have undergone considerable revision, particularly in the amount of ¼-in. material required in the combined mix, not only in the so-called open specifications, but in the patented ones as well, with the result that we are experiencing some difficulty in supplying this demand. This again brings up the question of whether washing crushed rock is the solution. It is quite well agreed upon that where the dry screening method is employed, particularly if the stone to be crushed contains some moisture, that in order to properly clean the product of dust a coarser screen must be used than is theoretically necessary. This naturally causes a loss of considerable finer crushed rock sizes, which is the very size we are short of today. In fact, recent tests carried on by this department show that approximately 25% of the material classified by us as stone dust is between ¼-in. and 10-mesh.

Try Washing Crushed Rock

The above figures, of course, are from laboratory screening and are more or less theoretical, but if we can practically reclaim 50% of this amount it will give us the necessary proportion of this size. At the present time we are experimenting with washing the crushed rock at one plant, and from the results it looks like the solution. However, at this time I am not thoroughly satisfied and will probably continue the experiment.

U. S. Government Forces South Dakota Cement Plant to Reduce Price

A CURIOUS COMMENTARY on "the government in business" is furnished by a recent incident in South Dakota, described in a local newspaper as follows:

"Much interest has been manifested in the controversy over the price of the cement to be used in the paving job west of Sioux Falls on federal highway No. 14. One of the contractors made a bid in which he met the requirements of the state highway commission in the matter of using South Dakota made cement (South Dakota state cement plant at Rapid City). He submitted a considerably lower bid if he were permitted to use other cement of what he insisted was of equal quality. The commission awarded the contract to another bidder who proposed to use the South Dakota article. Whereupon the federal engineers refused to approve the contract on the ground that the federal government was under no obligation to favor cement from the state plant as against other equally as good. It is understood that an agreement has been reached in offering state cement at a price to compete with the outside article."

West Coast Financial Writer Reviews Cement Industry

AN ARTICLE in the *San Francisco Chronicle*, by its financial editor, Carl C. Wakefield, reviews the cement industry in general, with particular reference to the West Coast part of the industry. Extracts follow:

"While eventually a second United States Steel Corp. of the cement industry may be created the transportation factor in the business makes it impossible for Eastern plants to compete on the Pacific Coast with local companies, or vice versa.

"It is feasible to transport cement by rail a maximum of 250 miles only and seldom this far. And while cement is used as a ballast and is cheap cargo, only about 1% of Coast consumption was imported before the Hawley-Smoot tariff and virtually none is now imported.

"Holding companies controlling plants in all parts of the Nation may arise, but if they do distribution of their subsidiaries will still be confined to the comparatively small territory in which their plants are operated.

"It is more reasonable to expect that merger developments that may occur in the near future will be directed principally toward bringing together producing units in the territories which they serve. Through such consolidations high cost plants could be abolished, operating, management and sales expenses reduced, and at the same time valuable trade names maintained.

"Wide and continued variations in the proportion of capacity utilized between sections indicates the ability of a local industry to expand even though the rate of operation is lower in adjoining districts.

"The fact that cement use has been highly seasonal in part explains the tendency toward overproduction capacity as facilities have been constructed to meet peak demands.

"Although there is great overproduction among the leading California cement companies, they have ample limestone reserves and freedom from Eastern or foreign competition and to that extent are more fortunate in that they are serving a territory rapidly growing in population and industry.

"A factor that is likely to prove of large importance in the cement industry is the trend toward elimination of small office buildings and creation of giant structures.

"With the demand for cement to be used in construction of office and residential buildings, which will grow as population in the state increases, and the future requirements for dams, bridges, irrigation projects, the industry is also fortunate in that new uses for cement are annually being found.

"If the industry doesn't go promotion crazy again on plant expansion programs when demand for cement again reaches and passes the 1928 level, it is probable that consumption may reach present production capacities long before the cynics now believe is possible."

Wisconsin Legislature Kills Plan for State Cement Plant

THE WISCONSIN LEGISLATURE on April 14 killed a bill providing investigation of the feasibility of a state-owned plant for the manufacture of Portland cement, by a vote of 62 to 26.

An amendment by Assemblyman David Sigman, Two Rivers, to promote the investigation for establishing such a plant at Manitowoc was refused adoption.

Assemblyman Ben Rubin, Milwaukee, author of the bill, asked the assembly to consider the power of the "cement trust," and said that many bids were made by the same trusts through different plants and forced higher prices.

Mr. Rubin declared the state should be as willing to go into the cement business as it is to go into the power business.

Arguments against the measure presented by Assemblyman E. G. Smith, Beloit, were that the cement business is too specialized and that the state does not have the proper raw materials for the business.

The appropriation of $10,000 for investigating activities and $20,000 for options on materials also was attacked.—*Madison* (Wis.) *State-Journal.*

One Missouri Rock Asphalt Company Expanding

WORK is now underway for doubling the capacity of the Hufty Rock Asphalt Co.'s mill at Liberal, Mo. Increasing demand for the company's product has made the expansion necessary. An output of 100 tons per eight-hour day will be the mill's capacity when the improvement is complete.

A roll type of crusher is being put in, which makes for greater efficiency and speed. Adequate additional horsepower is being installed to handle the heavier machinery with ease. The new equipment, it is stated, will make it possible for the company to produce a material of much higher quality than heretofore.

The Hufty company manufactures a surfacing material for roads, drives, parkings, floors and similar purposes from the rock-asphalt deposits on their leases here.

The experimental stage of this material is now well past. It has stood up perfectly under the hard wear of the Kansas highways around the Pittsburg district, and elsewhere where it has been used.—*Liberal* (Mo.) *News.*

Huge Potash Plant to Be Built in New Mexico

A PLANT to produce 5000 tons of commerical potash daily is being planned for Carlsbad, N. M., by the United States Potash Co., according to officials of the corporation who visited Carlsbad recently. Plans drawn originally called for a daily capacity of 1000 tons.—*Dallas* (Tex.) *News.*

Simplification of Coarse Aggregate Specifications in the St. Louis District

WHEN THE DISTRICT OFFICE of the National Sand and Gravel Association was opened in St. Louis, Mo., last year one of the major problems confronting it was the existing confusion of the specifications for coarse aggregates.

The need for simplification along this line had been brought out at the preceding annual convention of the association by R. L. Lockwood of the Division of Simplified Practice, U. S. Department of Commerce, and by F. H. Jackson of the U. S. Bureau of Roads.

Such simplification and standardization to give clear cut and definite specifications is generally conceded to be important to the engineer as well as to the producer and the user, since in that way the personal element and the grounds for differences of opinion between producers and engineers regarding indefinite clauses may be reduced, and the use of a more uniform type of aggregate made practicable.

District Was Surveyed

Hence a survey of the district was made by D. D. McGuire, district engineer in charge of the St. Louis office, which brought out the fact that there were ten different specifications in force in the various municipalities of the district to cover the grading of the coarse aggregates used in practically the same kind of concrete work for streets and pavements. These various specifications are shown in Table I, which indicates the wide range of size and grading specified for practically the same kind of concrete. It was found that no single sample of gravel could be manufactured to conform to all ten specifications and that the strict requirements of Specification No. 8 could only be met by screening out in the laboratory and recombining on a weight basis. Fourteen different screens were necessary for inspection and screen analysis.

Research work done in recent years by the various national associations has shown that the strength of concrete depends upon the amount of cement used, the water-cement ratio, and the proportion of fine aggregates, rather than upon the grading of the coarse aggregates, the strength being affected only slightly by ordinary differences in grading and maximum size of the coarse aggregates. Also such research has shown the economic advantage of using concrete mixtures designed to utilize naturally graded coarse aggregates containing all sizes, thus permitting a balanced plant production without waste, as against some of the older arbitrary specifications which enforced waste through the use of only certain sizes of the material.

With these facts in mind and in the interests of better concrete and more uniform aggregates, Mr. McGuire called together last August the municipal engineers, consulting concrete engineers, architects, ready-mixed concrete producers, and crushed stone and gravel producers of the district to discuss the advisability of simplifying the specifications for coarse aggregates.

Considerable interest was shown in the project and the group organized itself into a committee to carry out such simplification. A sub-committee was appointed to collect information and recommend a practical and satisfactory specification for coarse aggregates.

This sub-committee consisted of C. M. Barnes, department of sewers and paving, city of St. Louis; J. B. Clayton, city engineer of Webster Grove; D. D. McGuire, National Sand and Gravel Association; E. J. McMahon, St. Louis Quarrymen's Association; W. E. Pugsley, Missouri state highway department; Hymen Shifrin, department of sewers and paving, city of St. Louis; and F. W. Wolffe, engineer of University City; with Prof. W. H. Wheeler of Washington University, materials engineer for St. Louis county, as chairman.

This group specialized on gradation for paving concrete, and additional members were appointed for building concrete. These consisted of Wm. C. E. Becker of Taxis and Becker, consulting engineers; M. F. Marks, of W. J. Knight and Co.; and P. J. Hoener, secretary of the local chapter of the American Institute of Architects.

Literature Was Reviewed

A study was made of the literature on the effect of gradation, of gradation specifications throughout the country, and of the gradations of the materials available from local quarries and gravel sources, and it was decided that the critical points on the gradation curve were the percentage retained on the 1½-in. square screen and the percentage passing the ⅜-in. square screen, data indicating that the finishing ability or workability became defective if the amount passing the ⅜-in. screen exceeded 20%.

Considering both the requirements for workability and good construction and the characteristics of the materials available, the sub-committee, after a number of conferences and considerable work, agreed on the specifications shown, and in November reported its recommendations to the general committee, which recommendations were unanimously adopted after a few minor changes had been made.

Others attending the conferences and giving valuable assistance were Baxter Brown, consulting engineer; A. H. Beard, city engineer for Richmond Heights and Brentwood; W. A. Heimbuecher, city engineer of University City; E. T. Kronsburg, city engineer, Clayton; W. W. Horner, chief engineer, St. Louis; Jule Mueller, city engineer, Maplewood; E. C. Renard, city engineer, Ferguson; and George Roterman, president, Central Building Materials Co., St. Louis.

Stanton Walker of the National Sand and Gravel Association, and A. T. Goldbeck of the National Crushed Stone Association, attended conferences and gave valuable assistance.

The specifications which were adopted are given below:

TABLE I—SUMMARY OF COARSE AGGREGATE SPECIFICATIONS

Screen opening	Total Per Cent. Passing 1	2	3	4	5	6	7	8	9	10
2½-in. Sq.	.....	.....	.....	.....	.....	100	.....	100	.....	.....
2 -in. Sq.	.....	95–100	100	.....	95–100	95–100	.....	.....	.....	.....
2 -in. Rd.	100	.....	.....	100	.....	.....	.....	.....	100	100
1½-in. Sq.	.....	.....	.....	.....	.....	.....	95–100	50	*	*
1½-in. Rd.	.....	.....	.....	+90	.....	.....	.....	.....	*	*
1 -in. Sq.	.....	.....	50–100	.....	.....	40–65	.....	.....	*	*
1 -in. Rd.	30–60	.....	.....	.....	.....	.....	.....	.....	*	*
¾-in. Sq.	.....	35–60	.....	.....	35–60	25–53	35–55	20	*	*
½-in. Sq.	.....	.....	0–30	.....	.....	.....	.....	.....	*	*
½-in. Rd.	5–20	.....	.....	.....	.....	.....	.....	.....	*	*
⅜-in. Sq.	.....	10–20	.....	.....	10–20	5–13	5–15	.....	*	*
¼-in. Rd.	0–5	.....	.....	.....	.....	.....	.....	.....	*	*
4-in. Mesh	.....	0–10	0–5	0–5	0–10	0–3	0–5	.....	0–5	0–5
¼-in. Sq.	.....	.....	.....	.....	.....	.....	.....	0	.....	.....

*No intermediate sizes removed.

SPECIFICATIONS FOR COARSE AGGREGATE FOR PLAIN AND REINFORCED CONCRETE

Adopted by Joint Committee for uniform coarse aggregate specifications, St. Louis district.

GENERAL REQUIREMENTS

1. Coarse aggregate shall consist of gravel, crushed stone or other approved inert materials having hard, strong, durable pieces, free from injurious amounts of adherent coatings and organic impurities and conforming in all respects to the detailed requirements of these specifications.

GRADING REQUIREMENTS

2. The coarse aggregate shall conform to the following requirements for grading:

Class A

Gravel		Crushed stone	
Size of square opening, in.	Total per cent. passing	Size of square opening, in.	Total per cent. passing
2 -in.	95-100	2 -in.	95-100
1½-in.	75-95	1 -in.	40-70
¾-in.	35-60	½-in.	5-20
⅜-in.	5-20	No. 4 mesh	0-5
No. 4 mesh	0-5		

Class B

Gravel or crushed stone	
Size of square opening, in.	Total per cent. passing
1 -in.	95-100
¾-in.	65-80
⅜-in.	15-40
No. 4 mesh	0-5
No. 8 mesh	0-2

The fineness modulus of the coarse aggregate shall not be less than 6.75 nor more than 7.20.

Class C

Gravel or crushed stone	
Size of square opening, in.	Total per cent. passing
¾-in.	90-100
⅜-in.	20-55
No. 4 mesh	0-10
No. 8 mesh	0-5

The fineness modulus of the coarse aggregate shall not be less than 6.30 nor more than 7.00.

PHYSICAL REQUIREMENTS

Provision shall be made for limiting values of tests for physical properties, and should not exceed the following values recommended by the committee:

3. *Deleterious Substances*—The maximum percentages of deleterious substances shall not exceed the following values:

	Per cent. by dry weight
Shale	1
Coal	1
Clay lumps	¼
Soft fragments	5

4. The sum of the percentages of shale, coal, clay lumps and soft fragments shall not exceed 5 per cent.

5. Clay, silt and crusher dust in gravel or crushed stone removed by decantation shall not exceed 3.5% dry weight when tested in accordance with the requirements of A. S. T. M. Serial Designation D72-21 except that the wash water shall be passed through a 100-mesh sieve and all material retained thereon shall be returned to the washed sample.

6. *Soundness.*—Coarse aggregate shall pass the sodium sulphate accelerated soundness test except that aggregates failing in the accelerated soundness test may be used if they pass a satisfactory freezing and thawing test, as determined by the method of test referred to in paragraph 12.

Class A grading requirements refer to the coarse aggregate used in concrete paving work, and Class B and C requirements to the aggregates for reinforced concrete work, the survey indicating a justification for two sizes depending upon the spacing of the reinforcing.

The adoption of these specifications is felt by all interested in the matter to be a decided step forward in the way of better and more uniform concrete. It also permits the production of a uniform product throughout the year, and reduces the number of sizes to be handled in the material yards.

Their adoption has been quite general. It is understood that such action has been taken by the local chapter of the American Institute of Architects, by the city of St. Louis and practically all of the adjacent suburban cities, as well as by a number of consulting engineers and industrial companies.

In order to take care of any difficulties which may arise in carrying out these specifications, a fact-finding committee was appointed to receive comments upon the experiences with the adopted gradings and to make any necessary investigations. This committee, which consists of P. J. Hoener, representing the architects; M. F. Marks, representing the consulting engineers; H. F. Thomson, the material dealers; D. D. McGuire, the gravel producers; E. J. McMahon, the stone producers; and Prof. W. H. Wheeler, secretary of the committee, representing the municipal engineers, will serve for one year and report to the general committee at an annual meeting in November, 1931.

Local Research by Sand and Gravel Industry

In addition to the above, two research projects have been recently undertaken by the local members of the National Sand and Gravel Association, to gain additional information on the characteristics of coarse gravel aggregates.

Cooperative Selling Plan Launched in Eastern Louisiana

THE PRODUCERS of sand and gravel in eastern Louisiana realizing that something had to be done to correct competitive conditions, have formed the Material Service and Development Co. All of the producers in eastern Louisiana at the time (about six months ago) with the exception of the Holloway Gravel Co. agreed to sell their materials through the newly formed sales agency. None of the producers do any selling direct or employ salesmen, although each quotes if he so desires.

In forming this sales corporation all of the producer companies fixed upon a minimum production tonnage for their plants. A base price for material is paid each producer and profits of the sales company are paid to the companies on the basis of their tonnage allotments, in some such a manner as the sales organization that has been in operation in Florida for about five years.

The sales company includes eight sand and gravel producers with a total of 11 plants. One plant is not active at this time. The producers and plants are as follows: Amite River Sand and Gravel Co., Denham Springs, La.; H. J. Cowgill, Bogalusa, La. (plants at Bogalusa and Sun, La.), Hammond Gravel Co., Hammond, La. (plants at Easton and Baton Rouge parish, La.); Jahncke Service, Inc., New Orleans (plant at Roseland, La.); National Sand and Gravel Co. (two plants), Amite, La.; Boge Chito Gravel Co., Franklinton, La. (plant at Franklinton, La.); American Brick Co., New Orleans, La. (plant at Price, La.); Dear and Johnson, Amite, La.

A second corporation, the Flint Sand and Gravel Co., has been formed to take over the physical assets of the different producers; and this arrangement is now in the formative stage.

All of the above producers with the exception of the American Brick Co. are now units in the Flint Sand and Gravel Co. The American Brick Co., however, still handles its sales through the Material Service and Development Co.

Paul Jahncke is president of the newly formed Flint Sand and Gravel Co., and H. J. Cowgill, vice-president.

Crushed Stone Price War in Kansas City Results in $1,000,000 Suit

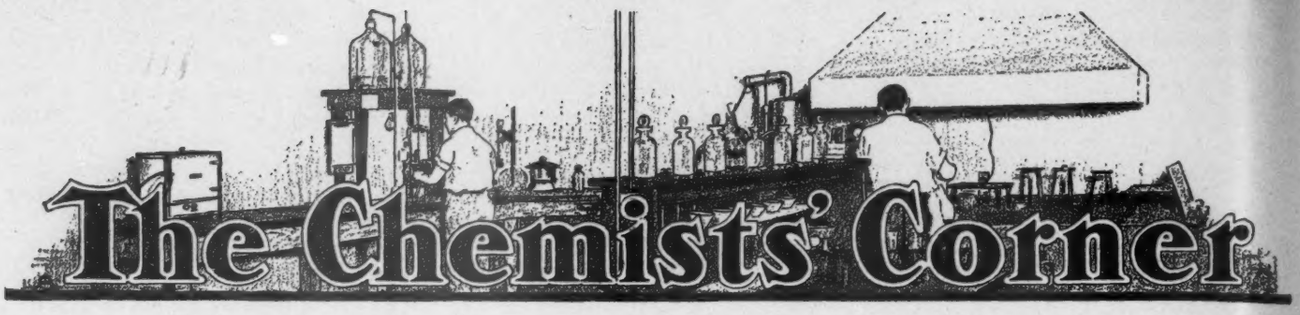
THE MISSOURI PORTLAND CEMENT CO., of St. Louis, Mo., was named defendant April 11 in a $1,151,800 damage suit filed by the Consumers Material Corp. in the United States District Court.

The plaintiff corporation, operated on a rental basis by the Stewart Sand and Material Co. of Kansas City, since January 6, 1930, charged that certain practices of the Missouri Portland Cement Co. brought about the suspension of business by the Consumers concern.

Charles M. Polk of the law firm Polk, Williams and Campbell, counsel for the Missouri Portland Cement Co., said April 13 that the Consumers Material Corp. had threatened suit for ten months.

"During that period," Mr. Polk said, "officers of the Missouri Portland Cement Co. made a personal investigation of the complaints and came to a conclusion there was no merit to the charges. Counsel for the company both in Kansas City and here investigated during the same period, and reached the same conclusion."

The suit deals in part with charges by the Consumers company that the Missouri Portland Cement Co. induced certain concerns to break contracts for crushed stone. (The Missouri Portland Cement Co. is in the crushed-stone business in Kansas City territory.—*St. Louis* (Mo.) *Globe-Democrat.*



Heat Balance of the Gypsum Plaster Kettle Process

By Wallace C. Riddell

Consulting Chemical Engineer, Standard Gypsum Co., Inc., San Francisco, Calif.

NUMEROUS TESTS have been made on the quantity of heat required for calcining gypsum by the kettle process at several Pacific Coast gypsum plants. A calculated heat balance is given here for a 10-day test run. The data were carefully taken and the tests made as accurately as the available apparatus would allow. Certain data are not as complete as desired, particularly the stack gas analyses, which were made on an Orsat with water in the measuring burette. To our knowledge, no similar data are available in the literature for the kettle process for calcining gypsum and the following is presented as a practical, approximate heat balance:

HEAT BALANCE OF THE GYPSUM PLASTER KETTLE

Data: Period of test—10 days.

Day	Time, hours	Oil, gal.	No. charges calcined	Ave. stack CO_2	Gas temp., deg. F.
1	24	718	9	7.6	690
2	24	603	9	8.5	680
3	24	601	9	9.7	680
4	24	626	9	9.9	670
5	24	624	9	8.3	670
6	24	643	9	8.7	680
7	24	647	9	9.5	680
8	24	629	10	8.3	700
9	24	613	9	8.9	670
10	24	619	9	8.1	670
	240	6323	91	8.8	680

Ninety-one charges at 12.6 tons raw gypsum per charge = 1146 tons gypsum charged to kettle.

1146 × 0.83 = 952 tons calcined gypsum produced.

AVERAGE ANALYSIS OF MATERIALS

	Gypsum feed	Calcined gypsum
Insoluble	1.20	1.45
Iron and aluminum oxides	0.25	0.36
Calcium carbonate	0.65	0.85
Calcium sulphate	77.30	91.50
Combined water	20.30	5.30
	99.70	99.46

	Gypsum feed	Calcined gypsum
Calculated $CaSO_4 \cdot 2H_2O$	97.1	0
Calculated $CaSO_4 \cdot \frac{1}{2}H_2O$	0	86.1
Calculated $CaSO_4$	0.5	5.4
Combined water loss 20.3—5.3 = 15.0%.		
Fineness 100-mesh	94.5	95.0
200-mesh	83.0	83.5

Specific heat of gypsum = 0.26

Average temperature of gypsum feed = 80 deg. F.

Average air temperature = 70 deg. F.

Calcining temperature = 340 deg. F.

Average temperature at which combined H_2O in gypsum is evaporated = 260 deg. F.

HEAT LOSS IN STACK GASES

	Lb.	Lb.	Lb. O_2		Lb.	Gases
C = 0.865 × 211 =	182.5 × 2.665	= 486.4	=	669	CO_2
H_2 = 0.115 × 211 =	24.3 × 8.0	= 194.4	=	219	H_2O
S = 0.006 × 211 =	1.2 × 1.0	= 1.2	=	2.4	SO_2
N_2 = 0.008 × 211 =	1.7	=	=	2284	N_2
	209.7	682.0		3174	

FUEL OIL ANALYSIS

Carbon	C	= 86.5%
Hydrogen	H_2	= 11.5%
Sulphur	S	= 0.6%
Nitrogen	N_2	= 0.8%
		99.4%

Pounds of air required per pound of oil = 14.0.

Heal value = 18,500 B.t.u. per lb.

Maximum CO_2 attainable in stack gas analysis = 15.5%.

$$\% \text{ Excess air} = \left[\frac{\text{Max. } CO_2}{CO_2 \text{ det.}} - 1\right] \times 100$$

Heat balance: Time, 1 hr.

$$\text{Gal. oil per hr.} = \frac{6323}{240} = 26.4 = 211 \text{ lb.}$$

Tons raw gypsum calcined per hour = $\frac{1146}{240}$ = 4.78 = 9560 lb.

Tons calcined gypsum produced per hour = 4.78 × 0.83 = 3.97 = 7.940 lb.

Heat input = 211 × 18,500 = 3,900,000 B.t.u.

Heat required to calcine gypsum:

1. To raise the temperature of gypsum to 340 deg. F. = 0.26 × (340-80) = 67.6 B.t.u.

2. To decompose gypsum = 3921 cal. per gram mol. = 41.1 B.t.u. per lb.

41.1 × 0.97 = 39.0 B.t.u.

3. Heat required to evaporate water at mean average temperature of 260 deg. F. = 0.15 × 937 = 140.5 B.t.u.

(1) + (2) + (3)

67.6 + 398 + 140.5 = 248 B.t.u. per lb. of gypsum.

248 × 2000 = 496,000 B.t.u. per ton of gypsum, $CaSO_4 \cdot 2H_2O$.

4.78 tons of raw gypsum calcined per hour.

496,000 × 4.78 = 2,371,000 B.t.u. per hr. required to calcine gypsum.

$$\frac{2{,}371{,}000}{3{,}900{,}000} \times 100 = 61\% = \text{furnace efficiency.}$$

682 lb. O_2 × 3.35 = 2284 lb. N_2.

682 lb. O_2 × 4.35 = 2966 lb. air required for combustion or 211 lb. oil × 14 lb. air per lb. oil = 2954 lb. air required for combustion.

$$\text{Excess air} = \left[\frac{15.5}{8.8} - 1\right] \times 100 = 76\%$$

Excess air = 2954 × 0.76 = 2245 lb.

Total weight of gases = 3174 + 2245 = 5419 lb.

Average specific heat of stack gases of above composition between 60-800 deg. F. = 0.24.

Sensible heat in gases = 0.24 × (680-70) × 5419 = 793,000 B.t.u.

$$\text{Heat loss in stack gases} = \frac{793{,}000}{3{,}900{,}000} \times 100 = 20.3\%.$$

SUMMARY

	B.t.u.	%
Heat input	= 3,900,000	100
Heat utilized in calcination	= 2,371,000	= 61
Heat loss in stack gases	= 793,000	= 20
Heat loss by radiation and other losses	= 736,000	= 19
		100

Determination of Fine Grain Sizes

THE DETERMINATION of sizes below the range of sieve testing is important in the rock products industry, especially when a study is being made of finely ground products such as cement, gypsum, ground limestone and the like. The air analyzer is used by the larger laboratories with great satisfaction, but the laboratories which do not wish to purchase such an expensive device rely on sedimentation and elutriation or rising current separation. These give quite as accurate results as air analysis if they are properly conducted. An excellent article by A. M. Gaudin, J. O. Groh and A. B. Henderson, of the Montana School of Mines, in the December, 1930, issue of *Industrial and Chemical Engineering*, describes the technique of sedimentation and elutriation very thoroughly.

Beakers of 800 to 1000 cc. capacity are recommended for sedimentation using 50 g. of the product to a beaker. A depth of 10 cm. of the liquid used is convenient. The pulp is stirred thoroughly and allowed to settle for a given time; the suspension is then decanted from the sediment by a siphon. The settling rate is determined by Stokes law. [$V = 450D^2(\delta - 1)$ is a familiar form of this; D equals the diameter of the particle and δ its specific gravity.—Editor.]

If all particles started to settle from the top, one sedimentation would suffice, but as they start at any point from the top to the bottom, the sedimentation must be repeated several times. In practice from 8 to 20 washings are required to give a substantially clear liquid at the end of the decantation period. The solids in the combined decantations make up the lightest grade.

The solids may be collected by flocculating with some agent. With water about one gram of sodium hydroxide to 20 liters and calcium to the same amount were found satisfactory. After flocculating the clear liquid is decanted off and the sediment dried on a hot plate and weighed. For really close separations the fines should be resorted and with water a deflocculating agent is necessary to disperse the solids to do this. One part of sodium silicate in 4000 has been found effective.

An apparatus recommended for sedimentation with a deep settling column and minimum fluid is shown (Fig. 1).

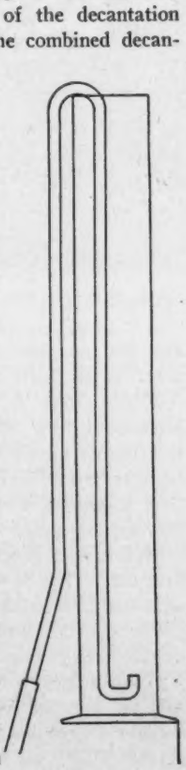


Fig. 1

It is made of a glass tube 5 to 8 cm. dia. and 40 cm. long with a glass base. It is conveniently made by removing the top portion of a 1000 cc. glass cylinder. Sample and liquid are added and the tube is closed with a rubber stopper and shaken. The siphon for decantation is placed in the tube at the end of the settling time. This is repeated until the liquid becomes clear.

Sedimentation in buckets is also described using about three siphons to a bucket. It is much more satisfactoy for the finest particles (below 1120-mesh or 11.3 microns), as the thinner pulp lessens the tendency to flocculate.

Elutriation is a more accurate sizing method than sedimentation. The article discusses elutriator design and gives the features that a successful design must have. In brief these are: Constant velocity of the liquid and uniform stream lines; the fluid should not be retarded unless such retardation can be measured or compensated for; all particles should be completely and continuously exposed to the flowing fluid; there should be no places for lodgment of particles, and the apparatus should be capable of handling fair sized samples, 25 g. or more.

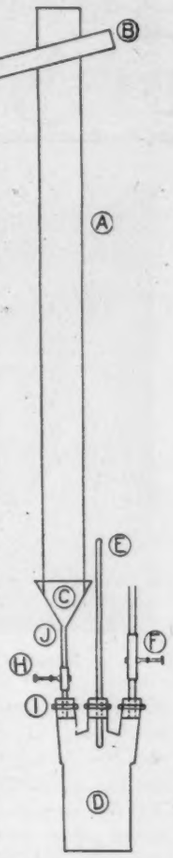


Fig. 2

After discussion of the ordinary forms the authors say they prefer the elutriator designed by Gross, Zimmerley and Probert at the Salt Lake station of the U. S. Bureau of Mines, illustrated in Fig. 2. It is made of a three-hole bottle, glass and rubber tubes and a glass funnel. The sorting tube A is fastened in this by paraffin or better de Khotinsky cement. Water is admitted through F, the amount being controlled by a screw clamp on the rubber tube. E is a thermometer so that corrections can be made for temperature. B is a launder for catching the overflow. The flow is set to the desired rate by knowing the cross-section area of A and weighing the water overflowing in one minute.

Three sizes of sorting tube A were used by the writers, a 12-cm. tube for separators at 150- to 400-mesh and a 2-cm. tube for separations above 100-mesh. The length of the tube should be at least six times the diameter, but ten times is better. The tube J had 1/100 the diameter of the tube A in the model used which guaranteed that no particles would settle in it, as the range of particle sizes in the samples was only 5 to 1.

The weighed sample is put in A and the current adjusted and run until the overflow is clear. Then it is adjusted for the next coarsest separation. For the finest separations it is best to add a little flocculating agent, such as sodium silicate.

Water is the most convenient of all fluids to use for separation, although of course it can't be used for cement, lime or gypsum. Distilled water is better, as it has no flotative effect from dissolved air. Other liquids were investigated. Such liquids as gasoline and kerosene led to flocculation of the metallic sulphides tested and hence were unsatisfactory for work on heavy minerals. Acetone proved the best of the substances investigated. It has a lower specific gravity and lower viscosity than water, reducing the time of settling to about one-fourth of the time in water. But it is too expensive to discard and has to be recovered by distilling it from the products.

Diagrams and tables show that the average grain size of the separated products as measured by the microscope was very close to the theoretical average size figured from the velocity of the rising currents used in the elutriator. The separations were from 86 microns (100- to 150-mesh) to 5-6 microns (1120- to 2240-mesh). The article includes a table of corrections for temperature. The variation from 11 deg. C. to 20 deg. C. is from 0.933 to 1.178 in practically a straight-line relation for water. These are factors by which the rate of flow should be multiplied. With acetone the factors to correct for temperatures from 11 deg. C. to 20 deg. C. range from 3.59 to 3.91.

For Industrial Photographers

NOTEWORTHY EXAMPLES of photography as used for various business purposes fill the pages of *Applied Photography*, a new magazine which makes its appearance May 1. The magazine is sponsored by the Eastman Kodak Co., to assist industrial and business firms in applying photography effectively in research, manufacturing, advertising and sales work.

The scope of the new magazine includes the industrial applications of still and motion pictures, photomicrography, radiography, and other forms of photography.

Each issue presents a different business objective, and illustrates how photography can aid in attaining it. The first issue deals with the question of obtaining photographs for advertising and sales purposes—photographs showing performance or utility.

The mailing list for the new Eastman magazine is open to executives in charge of advertising, sales, research, and factory production, and will be so classified that persons on the list will receive, without charge, such issues of the magazine as bear directly on their industry or profession.

Hints and Helps for Superintendents

Advertise Your Wares!

ADVERTISING is an intangible. One never knows how, when or where you will cash in on it.

Most gravel pits and quarries are alongside railway tracks or trunk highways, yet the average passerby has not the slightest idea what they are, or what they make.

An attractive signboard is not expensive and can give the plant a name, at least. It helps advertise an industry as well as a plant and its product.

The Allen Gravel Co., Memphis, Tenn., has such a sign at its Iuka, Miss., plant. The sign reads: "Allen Gravel Co., Memphis, Tenn.: For over 60 years these pits have produced 'Tishomingo,' nature's concrete for roads, economical, durable." The material is a naturally cementing gravel—note the trade name too.

An attractive signboard

General view of Montgomery Gravel Co.'s pit at Ireland Spur, Ala.

Saving Money by Attention to Details

LAST YEAR the Montgomery Gravel Co., at Ireland Spur, near Montgomery, Ala., constructed its third screening and washing plant. This plant is for the most part of steel construction. The operation, in essence, consists of a 12-in. Amsco, electrically-driven pump dredge that delivers the material to a spreading table which in turn serves a stationary screen followed by two three-decked Niagara vibrating screens.

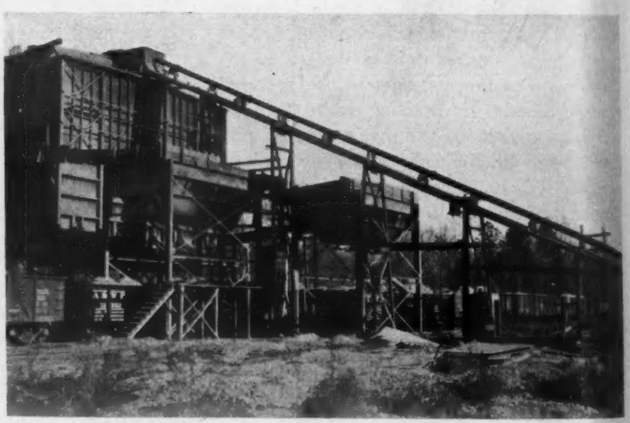
In the older plants the pipe line from the dredge entered the side of the plant before striking the spreading table, but in the newer operation the pipeline goes directly to the center of the top of the bins where the material strikes the two-way spreading table.

Now what does that amount to in practice? It simply has done away with one 90-deg. elbow which, according to these operators, in dollars and cents means that they have saved about $45,000.

They base this on their experience that a 90-deg. elbow on a 12-in. line is equal in frictional resistance to a 15-ft. vertical lift, and that one foot of vertical lift is equivalent to a 20-ft. horizontal flow. So in feet the elbow is equivalent to a 300-ft. horizontal flow of material. Now when the dredge gets a certain distance away a booster pump is needed and they figure that a booster pump costs five cents per ton, or expressed in terms of life of the dredgable area $3000 for every foot of vertical lift. Thus by saving 15 ft. (vertically) or 300 ft. horizontally they are to the good the total of $45,000 on the life of that particular area being dredged.

It is obvious, too, that greater distances can be pumped within reasonable costs thereby increasing the tonnage-life of the plant.

Another feature of interest in connec-



Pipe line goes directly into the plant

Stationary screens above vibrating screens

A very efficient straight-away dredging operation

tion with this operation is the spreading table, which is so arranged that the plant is really two plants under one structure. In the event that one-half of the plant is down for repairs the other half can continue to operate efficiently.

Increasing Belt Conveyor Life

By W. E. Philips
Engineer, Link-Belt Co., Chicago, Ill.

"HOW to increase conveyor life" is a question that greets me constantly. My answer is, pay attention to details.

Everything I have to say is based on the assumption that when the conveyor was originally installed the idlers were

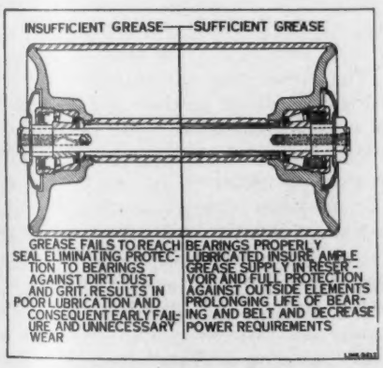


Fig. 1. Lubrication

lined up square with the belt; that an experienced engineer's advice was taken when determining on the belt design for the material to be handled; and that the belt was lined up correctly with idlers.

Even though the original installation was correctly engineered, it requires some attention, to get the best results afterward, just as an automobile does if the utmost satisfaction is desired.

1. LUBRICATION. Sufficient greasing with proper kind of grease. Fig. 1.

2. CLEANLINESS. Keep the space under the belt clean. Clean the decking when material overflows and threatens to clog the idlers. Clogging increases the friction load, resulting in greater power consumption and wear on the driving mechanism as well as idlers and belt, Fig. 2.

3. LOADING. Do not overload. Use an idler sufficiently heavy and a belt designed for the service expected. Have

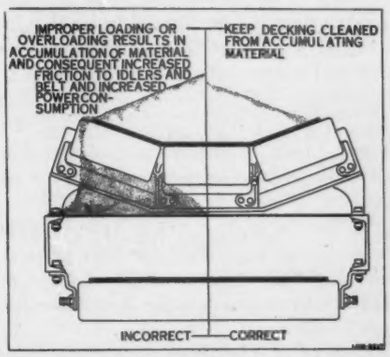


Fig. 2. Cleanliness

material reach the belt in the same direction the belt is moving and with as little impact as possible. Use feeders when necessary as they create a steady flow of material without shock to conveyor, Fig. 3.

4. WEAR. There are many reasons for uneven or premature wear on belts and idlers. Belts scraping against framework, skirtboards, or wedged material are the chief causes. Dragging idlers, caused by insufficient lubrication, or clogged rolls, cause undue wear on both the belt and idler, and put an extra load on the driving mechanism.

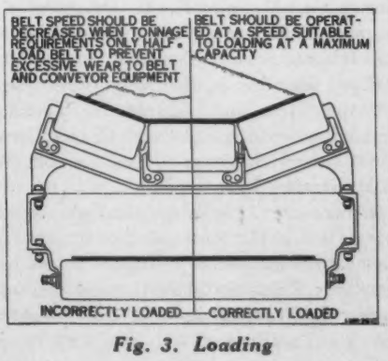


Fig. 3. Loading

5. TRAINING THE BELT. Train the belt while empty, then if it runs out of line when loaded it is because of unequal loading. Fix the loading chute or install a feeder. Adjustment cannot be made by taking up the take-ups on one side or the other. See that the belt contacts the center roll of the idler because this roll steers the belt. Foundations for the idler should be firm and secure. Side, or guide idlers, should not be used when training the belt. Do not increase belt tension as this will injure the belt without obtaining the desired results.

Aerial Tram for Drill Steel

THE BLACKSMITH SHOPS of the old quarry of the Santa Cruz Portland Cement Co., Davenport, Calif., are located at the extreme top of the deposit, some 350 ft. above the old quarry floor.

Several years ago the company changed the method of operating from steam shovel loading, to a glory-hole system of mining. This method as far as drilling and shooting are concerned, is regular quarry practice, the quarrymen caving down the sides of the raises or shafts with the limestone drawn

Aerial tram and tool carrier

out in chutes below. The drillers work on the steep sides of the quarry using ropes to prevent falling.

Transportation of the drill steel from the shop to the drillers is by means of a small gravity aerial tramway. A carrier line of small diameter is used on which rides the single tool carrier as shown by the illustration. Returning the carrier to the blacksmith shop is done by a small hand line.

A Milwaukee Newspaper's Columnist on Sand and Gravel Price Fixing

A SIGNED ARTICLE in the *Milwaukee Wisconsin News,* by one of its business writers, James Cullen, is interesting both because it contains a layman's view of co-operative selling organizations, and because it shows the local sand and gravel industry has at least one understanding newspaper friend. The article follows in full:

"To meet truck competition and to encourage city building programs, Wisconsin rails have secured the approval of the state railroad commission to a 25% reduction in sand and gravel rates from all points within the state to Milwaukee.

"E. A. Lalk, assistant general freight agent of the Milwaukee road, announced that the roads had been informed of the commission's approval of their application. He expects that the cut will tend to reduce building costs in the city, and will generally stimulate building trades.

"What effect the rate cut will have upon the sand and gravel dealers' price cutting war is uncertain, but it seems probable that it will put contractors in a better bargaining position. Producers at various points outside the county will be able to put down their products in Milwaukee at considerably lower prices, transportation charges being one of the largest costs connected with sand and gravel distribution.

"REFERENCE to the sand and gravel dealer's price-cutting war brings up a very peculiar situation that exists in industry today due to the inconsistent views taken by the government of price fixing by farmers and small building supply groups and price fixing by industrial concerns.

"Recently in this column some mention was made of the federal government's attack on the Sugar Institute; the Bolt, Nut and Rivet Manufacturers Association, and the American Petroleum Institute. Each of these organizations recently were compelled either to dissolve or abandon price fixing codes.

"Yet another arm of the government is continually fostering and financing numerous agricultural price-fixing ventures of one kind or another.

"It's wrong for the Bolt, Nut and Rivet manufacturers to attempt to fix prices for their products; but it's all right for the farm board to attempt to peg wheat prices. It's all wrong for the Sugar Institute to fix sugar prices, but it's good political science to encourage farm co-operatives to peg the cheese market, the grape market, and a dozen other commodities (if they can)!

"RECENT DISCLOSURES indicate that the Sand and Gravel Association of Milwaukee, made up of dealers and distributors of building material in the city, had also effected some kind of a price-fixing agreement.

"Prices of these materials were to be arbitrarily lifted 20 to 25% above 1930 levels, which were regarded as destructive and unprofitable. The trouble is now that the association doesn't seem to be able to make the agreement stick. Independent dealers refused to subscribe to the schedule and the price war is on.

"Meanwhile, it is reported that the state department of markets, on the rather new economic theory that the state is interested in the predicament of the dealers because it will gather no income taxes if they make no profits, has been fostering a co-operative association move that will bring the rebels into the ranks of the price-fixing group.

"PERSONALLY, PRICE-fixing agreements seem to be a palliative rather than a cure. In effect they permit weak or marginal producers or distributors with high costs to survive during a period of economic stress. The public temporarily pays the costs, but perhaps gets a little better service, and forestalls a potential monopoly by the two or three large concerns able to withstand unprofitable operations.

"There is no reason why efficient small concerns shouldn't be allowed to survive just as big ones, fortunate enough to have better financial backing. The only weakness in the government's attitude seems to be inconsistency. Why is it right for the farm board to attempt to fix wheat prices and the Sand and Gravel Association to attempt to peg the price of their products; and why is it wrong for the Bolt, Nut and Rivet Association to do the same thing for their product? And why did the government dissolve the Sugar Institute and ban the Petroleum producer's code?

"Looking at it materialistically, the inconsistency seems to be based upon comparative chances of success. The government probably realizes the wheat and farm commodity price-fixing schemes are doomed to failure. The only thing wrong with the sugar, petroleum and bolt men's scheme was that their plan did succeed or was likely to. As a matter of fact the sugar companies made millions."

Gravel Firms in Merger

FOUR NASSAU COUNTY, Long Island, N. Y., sand and gravel corporations and a trucking company have combined resources under the name of Local Sand and Gravel Co., Mineola, N. Y. Offices of the company were opened at Jericho Turnpike and Mineola boulevard.

Firms included in the merger are Hendrickson Bros., Inc., George H. MacLeod Corp., the Seaford Sand and Gravel Corp., the Westbury Sand and Gravel Co. and the C. V. Service, Inc.

Officers are: Frank Hendrickson, president; George H. MacLeod and Charles F. Young, vice-presidents; Walter E. Smith, secretary; Ralph S. Caldwell, treasurer, and Arthur J. Hendrickson, director.—*Brooklyn* (N. Y.) *Eagle.*

County to Insure the Use of Good Gravel for Roads

THE COUNTY COMMISSIONERS, at Terre Haute, Ind., have issued an order specifying the standard of gravel that shall be used on Vigo county highways in the future, in order to insure that proper material is used in their repair and maintenance. They say complaints have come in that inferior gravel and even cinders have been used on some of the highways and that it is no better than so much mud so far as keeping the roads in repair is concerned, according to members of the board. The order is to the effect that:

"In order to establish a standard by which the commissioners may be able to procure the use of gravel of even and suitable quality in the maintenance and repair of public highways in Vigo county and be sure that the board shall be able to obtain a constant quality for the price paid, all gravel purchased for the purpose of maintenance and repairs of public highways shall comply with the following specifications:

"Gravel shall consist of hard durable particles, uniformly graded from coarse to fine, a dry sample of which shall conform to the following requirements: Retained on a 1-in. screen, 3%; retained on a ¾-in. screen, 10-65%; on ½-in. screen, 25-80%; on ¼-in. screen, 55-100%, and retained on ⅛-in. screen, 75-100%.

"This gravel is commonly known as 75% gravel, 25% sand, clay or other natural binder on ⅛-in. screen.

"All gravel contracted for by the board shall be tested and a representative sample of 30 lb. shall be used for tests.

"The county road superintendent and his assistants shall not purchase nor use gravel for the maintenance and repair of any road in Vigo county which does not comply with the above specifications."

Commissioner Howard Leach states that he hopes this action will relieve the situation caused by the cinder and gob hauling, especially in Pierson township, where, according to Mr. Leach, they have been using gob for the past two years. "We want it further understood that all township superintendents must obey the specifications from now on, for every so often the gravel will be tested by the county engineer," said Mr. Leach.—*Terre Haute* (Ind.) *Tribune.*

One Missouri Rock Asphalt Plant Sold at Auction

THE KANSAS CITY Asphalt Co., whose plant is four miles northwest of Iantha, Mo., was sold under foreclosure April 4.

The plant represents an idea that may grow into a great industry in Barton county, but its machinery was too inadequate, and the expense of getting its material over practically four miles of dirt road to the Frisco tracks at Iantha was too great.—*Lamar* (Mo.) *Democrat.*

Reactions of Producers to Suggested Public Works Policy Conference

THE EDITOR has received some very interesting and valuable comments on his suggestion, made in an editorial in the March 28 issue, that the present price-cutting panic be made the subject of a national conference of two delegates from each of the construction materials industries, and representatives of public works authorities. The idea back of the suggestion was that in this way some public recognition might result of the obligation to maintain stable commodity prices, as well as stable wages for construction labor; the latter obligation has of course been recognized quite widely; in fact laws have been passed to bring about wage maintenance on public works.

* * * * *

Timely; Sane; Constructive

I have read your editorial on "A National Conference on Public Works Policies" with interest. My reactions are: (1) It is timely; (2) it is sane; (3) it is constructive.

I suggest that your next move should be to request all who indicate an interest in the matter to bring the suggestion to the attention of their representatives in congress and the secretary of labor, with the urgent request that they give it serious consideration, and that they be asked to assist in having a conference called as soon as possible. —J. K. JENSEN, President, Janesville Sand and Gravel Co.

* * * * *

Another Endorsement

I heartily endorse your suggestion for a National Conference on Public Works Policies. There are many abuses that probably could be corrected.

It is very true that the tremendous decline in commodity prices has added to the difficulties of the present depression. There is no need here to recite in detail the abuses that are going on today in many directions, as they are all well known.—E. J. KRAUSE, President, Columbia Quarry Co.

* * * * *

Of Possible Educational Value

I believe that anything of an educational nature, which would broaden the outlook of those engaged in any industry, is a good thing. It seems to me, however, that it would be particularly difficult to get any immediate results in the sand and gravel industry, due largely to the fact that so many of the different firms seem to have no confidence in their competitors, in a great many districts.

We seem to be particularly unfortunate in this district here. We have from time to time endeavored to get some kind of an organization but have met with so little success that we are completely discouraged. I presume that other districts are not in as bad shape as we are here and possibly something really constructive could be done in certain territories.

I am sorry that I cannot give you a more enthusiastic answer regarding your suggestions.—F. L. WARD, President, Ward Sand and Gravel Co.

* * * * *

Impractical

I feel you have touched upon the fundamentals that might lead to the correction of most problems that are facing the industry generally.

We are of the opinion, however, that sentiment, generally, at the present time, is not in favor of conferences of this nature and that business perhaps will seek its normal level just as rapidly as if a conference were held. It seems to us that our industry and the public have very indifferent interests in what may be accomplished through the medium of continued conferences; and believing this, I feel that a call for such a conference would not be representative, nor would an active part be taken. On the other hand, we feel that yours and other papers should be encouraged to continue your constructive suggestions through your mediums in line with that which you have been recently carrying.—H. E. BAIR, Vice-President, France Stone Co.

* * * * *

No Code That Won't Be Compromised

You state that "it would seem high time to arrive at some kind of a code or set of principles to govern public works contracts."

In the twenty-five years' experience I have had to do with public works of all kinds, I have never found a set of principles that did not have to be compromised to meet the whims and fancies of a constantly changing mental attitude on the part of the public. As to construction labor, it is such a small part of the total cost of production, we have always felt that the highest wages consistently paid brought value for every dollar expended.—J. L. SHIELY, President, J. L. Shiely Co.

* * * * *

Best Business Practice Comes from Within, Not Without

While you have called attention to a very incongruous situation, political considerations (which seldom, if ever, parallel sound, economic policies) would make a solution by that course very difficult, if not impossible. Such a conference if called by business interests would be looked upon with suspicion; and if called by the federal or state governments might be more or less motivated by political considerations. Perhaps this accounts for your observation that "Laws have been passed to maintain present wage scales, but apparently no public authority is ready to recognize the equal importance of maintaining commodity prices."

A non-political, non-partisan economic conference, with power, might accomplish something, but that would be going toward the Utopia from which we have long been drifting farther and farther away. The best in business, like happiness, comes from within and not from without; and unless an industry can itself solve its internal problems it is hopeless to look outside for a solution.—L. T. SUNDERLAND, President, Ash Grove Lime and Portland Cement Co.

* * * * *

Practical and Feasible

I read your editorial with interest. My personal opinion is that you are agitating a subject of fundamental importance, the solution for which will have to be found before any substantial gains or any permanent improvement in general business can

Foreword

WE DOUBT if any industrial paper ever was able to present a symposium of thoughts by so many outstanding leaders in its industry, on so interesting and vital a subject, as is here presented.

The very fact that these leaders of industry have gone to this time and trouble to give their thoughts as here expressed is ample evidence of how thoroughly industry is aroused to the necessity of meeting more intelligently the ever-recurring problem of business depression and all its attendant evils.

Our own editorial efforts are rewarded many times over by having stirred the thoughts of these men into expression. Our principal aim is, and will be, as one writer here clearly puts it: "You provoke thought, and that's what we need."

We are more than grateful to these men for the benefit of their thoughts, which certainly will provoke more thinking. And we are certain that we are not overreaching our editorial prerogatives when we also thank them in the name of industry, which is justly proud of such leadership.

—The Editor.

take place. Your proposal seems both practicable and feasible.—REED C. BYE, Vice-President, Warner Co.

* * * * *

Prepare Now to Meet Emergencies in 1940!

I would favor calling the proposed convention to discuss means to create public sentiment that will result in legislative action: (1) To permit employers to make arrangements to avoid uneconomic ruin through unregulated competition and to keep government from contributing to that sort of competition; (2) to take from excess wealth created in "prosperous times" substantial sums as an insurance fund to be held and used in ways to result in providing employment and paying wages when and in districts where unemployment develops beyond the ordinary.

Campaigns to collect funds by voluntary charitable subscriptions can hardly be called an efficient method, or at all sufficient as shown by experience.

Recent items of statistical news include the statement that authorities estimate the national payroll in 1930 at nine or ten billion dollars less than in the preceding year. This was in the face of national conferences (called by the President and by national associations), conferences called by the governors in many states, conferences of governors from many states, and hundreds of conferences of more local character—all of which passed resolutions and appointed committees that accomplished something. No one knows how much worse the situation might have been without these extraordinary activities. No statistics are published as to how much *more* than otherwise would have been, was spent to keep the wheels of industry turning, nor how many *more* were kept employed. Is it likely that a national conference with speeches, and resolutions and committees can have an effect that is prompt enough to be of significant value as applied to the present emergency, whether it gives further attention to unemployment, or considers how to help employers in their competitive troubles—all of which are more or less involved as one problem?

Now is the time, it would seem, to confer as to the emergency of 1940, and those to follow it. Prevention is the thing needed, and prevention has to come before—not coincidentally.

The only source of wages is the wealth we create, and since voluntarily and individually we do not and probably cannot provide in times of excess prosperity and optimism for the certain restriction in production to follow, we ought to be willing to pay a big insurance premium when prosperous to care for the population's needs in times of depression, but this could not be practicable unless required continuously of all who accumulate surplus wealth. If then all producers contributed to such an insurance in proportion to the surplus they win, it would seem fair to give more protection to employers against unwise competition, however presented. The investors, or employers, will pay this much through the reduced earnings and increased losses during depressions, if they do not pay it in some form of insurance premium or accumulated reserves during prosperous times.—C. L. MCKENZIE, President, Duquesne Slag Co.

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Constructive and Valuable Suggestion

It is my opinion that your idea is a very good one, provided, as you say, that this will be a real conference and an exposition of facts and an exchange of real and constructive ideas, rather than what you term a "talk fest."

Your editorial is, to my mind, an extremely constructive and valuable contribution.

I agree absolutely that the minds of the engineers in charge of state and federal construction do not meet those of the producers of commodities entering into and incidental to public works construction.

The increase in the number and size of civil service bodies, such as state highway departments and federal highway departments, carries a dangerous proclivity for these bodies to reach out, more and more for control and actual carrying out of activities which should properly be confined to private industry. This is evident in proposed legislation in state governing bodies, which originates in civil service bodies.

Of course, the fault is not all on one side and when an uneconomic condition has been corrected, as it was in Washington, D. C., it seems to me that it would have been much more sensible for price increases to be made gradually, rather than to attempt to correct a condition, which had been growing worse for years, all at once.

It seems to me that this sums up my ideas in the matter and, in closing, I wish to congratulate you on your editorial.—H. V. OWENS, President, Eastern Rock Products, Inc.

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If Wage Levels Are to Hold Prices Must Also

I have read with much interest your March 28 editorial and I am very much in sympathy with your platform, as outlined in your editorial comment referred to above.

I personally believe that a national conference on public works policies would be productive of good results, providing it is properly conducted. I mean by this that there should not be more than one representative attend this conference from each industry, otherwise it would be too long and drawn out and would not likely be productive of anything worth while.

Your comment on the attitude of the engineer-commissioner of the District of Columbia, regarding the recent advance in the price of gravel, is very interesting. However, I do not agree with you that the gravel producers in the District of Columbia should have limited their increase in price to 15c. per ton if 30c. per ton is necessary to show them the proper profit. Furthermore, I am of the opinion that very few concerns in this line of business, or in the rock products industry in general, are showing any profit at all; and this to my mind means only one thing; that if wage levels are to be maintained price levels on the various commodities must not slump below the present market levels, and in most instances it will be necessary to increase prices on many commodities if wage scales are to be maintained.

In conclusion I wish to say that I think you have opened up a question that is worthy of earnest consideration by both the general public, as well as the producers, and we sincerely hope that something productive may come out of the suggestions in the near future.—RAY C. NOLL, General Manager, Whiterock Quarries.

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Must Apply More Common Sense

There is much that appeals to me in your editorial comment which I have read with very great interest. I should welcome any suggestions which would tend to bring about common sense to bear on our problems, especially in this day of evident business and mental depression, although I have, rightly or wrongly, little faith in the efficacy of any large conference which usually becomes ponderous and long drawn out.—JOHN J. GALLAGHER, President, Goodwin-Gallagher Sand and Gravel Corp.

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Producers Vitally Interested

I have read with interest your editorial in the March 28 issue of ROCK PRODUCTS and think your proposal is not only practicable and feasible but very well timed. Those industries furnishing material for construction purposes should be vitally interested in such a national conference.—W. F. WISE, President, Southwest Stone Co.

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An Important Point in a Complicated Competitive Situation

I have been much interested in reading the editorial and think that you have hit upon a very important point in connection with the complicated competitive situation in our industry.

I hope that you will be successful in bringing about the national conference, but if you find that you are unable to get the public works authorities in the different states to co-operate, I suggest that a conference be held attended by the delegates from the construction materials companies and that they go on record concerning the

present abuses and state their opinions on proper public policies.—PAUL P. BIRD, President, Boston Sand and Gravel Co.

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Must Fight Government Encroachment on Business

The subject is certainly interesting to the writer.

Besides being mineral aggregate producers we are heavily interested in the construction industry as contractors and we have through the A. G. C. battled this "government in business" idea for years. It has been a huge problem for the contractors, and they have waged warfare alone. It now seems our public officials are reaching out further where it directly affects related industry, manufactures, etc.

There surely must be something done to offset this government in competition with private industry, that seems to be gaining a stronger foothold throughout our nation. It was the writer's privilege to be elected a member of the Utah state legislature, and to serve during the recent session. There were bills proposed that would have given various commissions great power, actually constructing public buildings with convict and hired labor. These same commissions could develop and operate plants of various kinds for the production of various commodities, and if successful in passing such legislation would actually have put out of business private enterprises, which through years of endeavor, hardships and inclusion of capital have rendered a service to mankind for a small margin of profit. The funds for the installation and operation of these government in business ideas would come from the ever fruitful but burdened taxpayer, of which private enterprise is one. Private industry would find itself actually helping finance a most vicious and inefficient competition.

Enterprises Must Co-operate to Protect Themselves

In our legislative session just closed it was fortunate that there were enough members who opposed these ideas, but they were bitterly fought. The experience has served as a lesson to private enterprises that they must co-operate to protect themselves from the public official, who can always manage and operate every-one-else's business, but has never successfully managed or operated his own in competition with legitimate business men.

Yes, surely something must be done, not only to protect private industry but to protect the tax-paying public from the wasteful, inefficient and expensive politician. I feel that the plan for a National Conference on Public Works is a step in the direction for the interests of the Great American Building Industry.—ERIC RYBERG, President, Utah Sand and Gravel Products Corp.

No Problem of More Fundamental Importance

Undoubtedly there is no problem confronting the producer of construction materials of more fundamental importance than that of maintenance of wage scales. This problem of course is not confined to the construction industry. It is an acute problem in every phase of industry in this country.

I believe that in this instance a great deal larger percentage of executives is considering the seriousness of this problem, from both its theoretical and practical point of view, than has ever given thought to it before. This has resulted in much less tendency to cutting wages than has heretofore occurred in periods of unemployment when the theory of supply and demand has indicated that almost any wage would provide the necessary labor for the time being.

I would be very glad indeed to get my own ideas on this subject cleared up as the result of the publicity which might come from such a conference as you suggest. The newspapers have carried some indication that President Hoover was considering some conference along this line, although undoubtedly it would be of broader scope than to include only the construction industry.

I think your point is well taken that the construction industry would serve very well as an outstanding example of the situation. It is the one industry more than others where industry itself comes in direct contact with public officials, and the net result of the reaction between the two will determine the facts as to the wage policy of the construction industry of the future.

The cases you refer to particularly might be multiplied many times where public officials have taken advantage of bidders on construction material to bring about lower prices. In the cases with which I am familiar, I believe this has been done from a sense of responsibility to the public, however mistaken this sense of responsibility may be. Back of this, however, and more controlling, has been the insane competitive policy which seems to be dominating particularly the cement industry at this time.

In the case of the Missouri state highway officials, they did nothing to bring about the first break in price of cement, which they received as the result of their first advertisement. One or two companies only, for reasons which undoubtedly were sufficient to them, broke the price structure which had previously prevailed. As the result of this, I am quite sure the other companies brought great pressure to bear on the highway officials to throw out the bids and re-advertise. This was done with further price reductions, netting the cement companies less than the dollar you refer to. While the second letting changed the allocation of cement very greatly and resulted in lower prices, I do not believe it satisfied any larger percentage of bidders than would have been satisfied with the first letting. The point is that I believe some of the cement companies themselves were fully as responsible for readvertising for bids as were the state officials.

In our immediate territory we are confronted by the probability of demoralized prices on crushed stone. This does not come about because the highway officials have been trying to break the price, nor are they advertising for bids. It comes about primarily because one or two of the producing units in this section are not satisfied to scale down their proportionate demand for business to the facts of the case as represented by the business available, but one or two apparently believe that by price cutting they can either secure a larger percentage of the available business and so reduce their losses, or they may think they can drive some competitors off the market.

I would be tremendously interested to see the results of such a conference as you suggest. I probably would be influenced by such a decision, but back of that and back of every similar company, there is the pressure of owners and directors to keep the balance sheet out of the red. They are not much concerned with theoretical considerations of purchasing power or stability of employment. In the last analysis that is the necessity to which management must respond, or there will be a change in management.—JOHN PRINCE, President, Stewart Sand and Material Co.

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Doubtful of Any Tangible Accomplishment

It appears that the subject which you have brought up is certainly in need of attention, but it is a little doubtful as to whether a national gathering on the subject at this time would be attended by the people whom you wish to reach. Probably you would get a good deal of publicity out of it, however. I personally doubt if it is a matter that can be worked out in a national way all at once, but perhaps can be handled in smaller groups.

I am sorry that I do not have any suggestions to make, but it is a matter which at least can have full consideration at future annual conventions and other meetings of those industries connected with the construction industry to the end that some program may be worked out.—ALEX W. DANN, Vice-President, Keystone Sand and Supply Co.

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For Deflation of Prices and Wages

Kindly permit me to say I think you are on the wrong track. It is my belief that today the trouble of the country is that the public won't buy because it doesn't believe prices are right.

And this means it won't buy real estate, buildings or new improvements, because prices aren't right. I am firmly convinced that all wage scales have got to come down.

If public works are built costing too much

money it means then that the public is going to be burdened for years to come with our excessive taxes and more excessive taxes. High taxes have caused revolution before and they may cause it again.—W. H. George, General Manager, Cowell Portland Cement Co.

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Sound Principles Too Soon Forgotten

I have read with interest the editorial in your issue of March 28 suggesting a Conference on Public Works Policies.

There is much to commend in this editorial and a great deal might come out of such a conference. Unfortunately, at times like these sound principles of business are forgotten and the sooner we get back to these sound principles, the better off we shall be.—Frank H. Smith, President, Lawrence Portland Cement Co.

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Public Works Purchasing Power Possible of Great Good, or a Dangerous Weapon

Your thought of awakening opposition to the methods being used in awarding cement requirements of various states is very timely and certainly has the merit of being on the side of justice.

The very large tonnage which some states purchase annually constitutes a tremendous purchasing power which when used fairly and intelligently works out for the good of all concerned, but when it is not so used it becomes a dangerous weapon that often proves detrimental to the welfare of the state, to industry and to the labor depending on the latter.

During the present year there have been several instances where states have asked for public bids, which when opened have shown reasonable prices, with a wide variation between the high and low bidders. In almost every case justice and fair play would demand that the awards be made to the lowest bidders. But this did not always happen. In several cases bids were rejected; in some states as many as two or three times, with the result that the low bidder's prices and his disposition to favor the state were disclosed and he was thereafter subjected to very keen competition, and his prices beaten down to the level of actual costs, or less.

Another very unfair policy practiced by the officials of many states is to prohibit out-of-state manufacturers from participating at equal prices in state purchases. The constitution in the interests of free and unrestricted exchange of traffic between the states prohibits the leveling of a tariff by one state against the products of another. The intent is very plain; but the officials in some states disregard it and through the policy above mentioned very effectively prevent out-of-state manufacturers from enjoying free and unrestricted exchange of traffic so far as state purchases are concerned. The policy appears absolutely un-American and to our mind should be discontinued.

Whether these conditions could be corrected by conference is open to question. We fear not. Politics enter so strongly into many of the state purchases that frequently observers are forced to the conclusion that the rejection of bids, when prices are obviously low and fair, is not always for the purpose of getting still lower prices, but is frequently done for the reason that the bidders who were expected to get the business are not low and therefore the bids are rejected that they may be given another chance to bid.

We must all recognize that the state officials charged with the purchasing of materials should seek to obtain the best prices possible consistent with fair and just dealing. No one can object to this, but when the officials of a state through rejection of just bids at reasonable prices practically resort to the tactics of the auctioneer and through such methods reduce prices so that they will no longer pay any profit to the manufacturer, then such action becomes detrimental to the state, to the manufacturer and to labor.

Existing conditions are unjust and therefore very unsatisfactory, but a discussion such as you have proposed would in our mind fail of its object. We feel that more could be accomplished if publications such as your own continued to call the officials' attention to the unfairness of the tactics pursued during the present year and thereby bring to their minds the necessity of restoring confidence among producers of materials, by each state adopting a policy of making awards to the lowest bidder in every case, unless prices submitted are obviously unreasonable or the low bidder is unable to qualify.

We think more could be done by the press to bring this about than could possibly be accomplished through conference.—H. Struckmann, President, International Cement Corp.

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And Some That Must Be Anonymous

The editor has received other communications, equally interesting and valued, from executives for whose opinion he has the highest regard, but who, unfortunately specifically asked that they not be quoted—for one reason, we presume, because they thought their ideas would hardly be considered optimistic. However, their thoughts are so interesting and helpful a contribution to this discussion that we will append them here as anonymous.

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Must Continue to Run Our Own Business

I do want to say, however, that I think you are on the wrong track in attempting to call a public works conference, to be attended by representatives of the producers, and of the public works departments of the several states, for the purpose of establishing a code to govern bidding on public works contracts. It seems to me, that this is a matter which the producers must handle by themselves. It is an easy thing for a state legislature to set a minimum wage for labor on public works contracts and to regulate the hours of work.

If a conference were to be held with representatives of the public works departments, and any measures should be adopted which would tend to regulate price cutting by the producers in any manner which might provide a fixed percentage of profit, it is doubtful in my mind if this could be done without the approval of the legislature. If the producers approve of price fixing by the legislature in hard times in order to protect their profits, they will have to abide by price fixing by the legislatures in good times, in order to limit their profits.

I don't believe the producers want their business turned over, to be run by the state governments. They should be, and I think are in most cases, quite able to take care of their own affairs.

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Afraid a Code of Principles Would Have No Binding Power "Back Home"

I have been very much interested in reading your suggestions for bringing about a better understanding between material producers and public works construction authorities. Your comment is very timely. Price structures of cement, aggregates, bituminous materials, etc., are very much disorganized and do not represent "fair price" by either of the definitions quoted by you. We would, of course, like to have stabilized prices, taking our chances on getting business based on quality of material and ability to give service. We would also like to have the public authorities recognize such sources of supply to the exclusion of wayside developments as well as adopting a policy of keeping the public works departments out of the production of materials.

The conference idea which you suggest is interesting. I believe, however, that a declaration of principles adopted by such a conference would not be binding "back home." Local politics would influence more than a national conference. If delegates from a state highway department in attendance at such a conference should agree to a principle, but its state legislature initiate and pass legislation opposed to such principle, how could the principle be enforced?

Is our trouble of low prices due in any great measure to public works authorities? Isn't it due more to the cut-price producer who depends on such tactics to sell his product, which other producers feel forced to meet with a lowering of the price level? This seems to go on by steps until profit disappears and losses build up.

Should public works authorities consolidate their purchases for a year's requirement? I believe this should be governed by principles which would insure distribution. I have in mind a state's annual cement requirement which would take the output of a plant or more. Isn't it more equitable and for the best interest of the various localities of a state to have such an order distributed rather than award to one on a bid a little below market? Taking bids on such a large quantity is too great a temptation for some producers.

We think you are doing a good work in making this suggestion, and in bringing it to the attention of the industry. You provoke thought and that's what we need, and the conference you suggest would probably be a means of developing new thoughts and exchanging them with the result that the compiled minutes would be guidance for all members of the industries.

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Agreeable But Cautious

I gave this very careful consideration, and while being heartily in favor of starting a movement to improve the situation, I did not deem it advisable to make any comments for publication.

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No Weakness or Imbecility Here, Say We!

I am afraid your suggestion to hold a National Conference would get nowhere. It seems to me the whole problem is too complex to try to find a formula which will solve the general problem, that a conference would result in nothing more than a debate, or perhaps even only an argument between different interests.

I suppose in a general way there has been such a depletion in what is nominally called money or credit, or a letdown in confidence by which those who have money or credit fear to spend, that nothing much will be accomplished until this confidence is restored. It may be possible that our price levels measured in a gold dollar are too high in comparison with the world labor rates, based on a gold dollar. If, perchance, this is true, then there may not be enough gold in the world to pay for that which people might be willing to buy; therefore, it might be that there would have to be a greater amount of work done on lower rates based on gold. In other words, the gold, or the credit based on gold, would have to be greatly divided up, in which all would take a less share. If this were true, it might equalize the whole question and everybody would be as well off; but then, to make any such adjustment involves a political, economic and sociological question, and you can't get them all settled in any sort of conference, because people will hold different viewpoints.

I am somewhat doubtful as to the advisability of holding up the present wage scales, from an economic standpoint; on the other hand, if there is an attempt to break down the wage scales, there will be just as much chaos by reason of the opposition of labor, because it will not understand that the cost of living will come down in proportion to reduced wages; that is to say, what may possibly be the practical solution of the question becomes impossible from a psychological standpoint.

Your point seems to be that public officials are taking advantage of invested capital to the advantage of labor, in trying to get the cost of public works down; but from the standpoint of public officials, why shouldn't they try to get the costs down? Who is going to pay the bill, if they don't? The people who pay the bills are the same ones about whose interests you are concerned.

It may be a confession of weakness or imbecility to say that we will have to sit down and wait for natural developments to solve the question, but when all is said and done, I am rather inclined to think that the combined intelligence of a few analysts will not be able to persuade the vast majority of people that the solution of the analysts or economists is the correct one, and will, therefore, attempt some other solution, which will be even worse.

I am strongly inclined to believe that the only thing that can be done, and will be done, is a gradual readjustment, until there is a balance between the purchasing power of the country and those interested in supplying the material for purchase. You may think this is a childish solution and a frightful confession of a lack of economic wisdom and ability, but I am afraid that all of the things entering into a solution of the problem are so vast and conflicting, they cannot be settled by a theory, nor a formula. They will have to adjust themselves on the principles of supply and demand—supply of money or credit on the one side, together with hope and courage and an adaptation to the situation by those on the other side.

I should like to discuss the question with you, and I have thought a lot about it; but I am sure that if I were made the dictator of the country, I would not have the least idea of what to suggest.

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The editor was specially asked not to publish the foregoing, but the writer of it is a genuine friend and it would be most unfair to our readers to leave out his contribution. Since we have not disclosed the identity of the writer, we are sure we can make our peace with him when the time comes. Undoubtedly his thoughts are those of the great majority of us. We struggle valiantly in our minds to arrive at something concrete and practicable, able to see all the faults in our economic structure, yet overwhelmed by the magnitude of the problem and the multiplicity of details in attempting to correct them. But those who have faith that the mind of man will eventually triumph over nature's environment, we presume, will continue to think on. Our only wish is that our successors in this thinking business may pick up our threads of thought where we leave them, instead of starting again at scratch!

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Plan Brought to the Attention of Authorities

Incidentally, copies of our March 28 editorial were sent to the governors of the various states; and many of these have been graciously acknowledged. It was also brought to the attention of former President Calvin Coolidge (who was suggested for chairman of the conference) and duly acknowledged. From President Hoover's emergency committee for unemployment the following acknowledgment was received:

"The appeal throughout the past year has been entirely in accord with the position which you take. The effort has been made throughout the country to maintain the prevailing wage scale both as a matter of fairness to the workers and also as a matter of sound economics.

"It has not been the aim to merely assure maintenance of wages on construction work, but throughout all industry. In this effort there has been splendid co-operation on the part of most employers. The tendency to force down the price of materials certainly has its effect upon wages of those engaged in the production of such materials. This has been given considerable attention, but no way has been discovered to overcome the effects of the close bargaining which has prevailed."—Fred C. Croxton, member of the committee.

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Comments by the Secretary of Commerce

As you know, the Federal Administration believes that every reasonable effort should be made to sustain wage scales in private industry as well as in connection with men employed directly on public works construction. This policy has been widely accepted, and generally carried out, throughout the country.

The spirit of fair play within the community should be brought out and made effective wherever the prices of materials are in danger, through over-zealous public purchasing, of being forced to levels that would necessitate wage cuts by producers. Full and open discussion of the issue and of its ramifications should be of substantial aid in such cases.

The circumstances under which a national conference can be successful, and under which it justifies the time and energy involved, demand careful review, as well as the question of meeting the expenses involved. The calling of one in this connection should, in my opinion, be weighed carefully in the light of such local efforts as may be made to deal with the problem.—R. P. Lamont, Secretary of Commerce.

Editorial Comment

Current Prices Of Rock Products

A canvass of Rock Products' subscribers has convinced the editors that our "Current Prices of Rock Products" section is of doubtful value at the present time, because of the rapid changes taking place, and the demoralized condition of price structures. This department of the paper has been an exclusive feature for many years, and as many letters and interviews in times past have proved—and many letters in our recent questionnaire as well—this department of current price quotations has been very helpful to the industry. It has had a stabilizing effect, which we sincerely hope it will again have in happier times.

We shall not discontinue this feature entirely, but will, for the time being, at least, confine its publication to one issue per month—the first issue in each month. We shall not publish it in quite so much detail—confining quotations to producers who have assured us in all earnestness that their quotations are truly representative.

Look Forward Not Backward

It is increasingly evident, in this field at least, that deflationists are gaining in the battle of the "regulars" versus the "progressives" in economic theory and practice. Wage reductions, held in abeyance in many instances for over a year, are becoming more general. This was inevitable unless a way could be found to check the continuous decline of commodity prices. Had beliefs and sentiment been unanimous, perhaps things would have come out differently. As it is, an industry can hardly continue half deflationist and half inflationist.

The President and his Secretaries of Commerce and of Labor, and his Emergency Committee on Employment, have done much to hold up wage cuts through the creation of a belief that wage reductions would deter so much the longer a return to "normal conditions." In this the President has had the moral and active support of many employers, large and small, and of a very large part of the newspaper and business press. The President has also had the support of law in the maintenance of wage scales for construction labor on public works. But in the purchase of construction materials for public works the problem of overcoming the tendency "for sharp bargaining," as a member of the Emergency Committee on Employment has put it elsewhere in this issue, was too much even for the Administration to solve. Without something more than the expressed wishes of the President and his advisors, it seems impossible to halt such wage cuts longer.

While some may have to abandon ideals and convictions in regard to high wage economics temporarily as a matter of expediency, we probably shall come back to them in due course with the return of prosperity. If it is necessary to hit bottom before we can start up again, the sooner we hit bottom the better for all concerned. It is idle now to speculate on what might have been; for example, that little more cement will be sold at 75c per bbl. than would have been sold anyway at $1.75, is too obvious for comment. Cement manufacturers knew it when their troubles began. With scarcely more than 60% of the capacity of the industry utilized it required great intelligence, foresight and forbearance on the part of management in every case to be satisfied with its 60% of available business.

Unanimity wasn't there. Probably it was far too much to expect it would be there. A more equitable distribution of the available business was inevitable; if not on voluntarily fair and profitable terms, then to be forced upon all by a price war likely to prove ruinous to many and profitable to none.

The ultimate solution of the problem of over-production, or over-capacity, and the economic ills it brings is, we are told, *education of producers.* Well, the producers are being educated, by a costly, brutal perhaps, but nevertheless very effective method.

So much for the past. That's over with and cannot now be undone. Producers have to face the problem of getting by with the prices they have forced upon themselves. They cannot do it without greater economy in both production and sales. Obsolete equipment will no longer fill the bill. Operators may have to go heavily into debt to get new machinery and equipment, but most assuredly they will go into debt also, if they do not. In the first case it is an investment with the probability of a decent return; in the second case it is a hopeless loss. While no one is going to profit at present prices, some will lose much more than others. The ones who will lose the most are those with obsolete plants — in many instances probably those very same plants which recently have been driven to extremities to get near 100% capacity at the expense of their competitors in order to operate at all.

Prices probably will not stay down indefinitely. Not even the deflationists appear to believe that. The deflation is merely a means to an end, so to speak; merely going back to scratch so as to get a fresh start. So one of the first things producers should do is to prove to the country that prices actually have hit bottom. Until then there is bound to be continued hesitation and uncertainty in all lines of industry. It can't be done, or it won't be believed, by proclamation. There must be proof. Prices must start to rise.

If the producer finds it necessary to cut wages, or contemplates doing so, as a last resort cost economy, he must not figure that they will stay down. There is going to be no substitute for efficiency and adequacy of plant; wage reductions at best can be considered but a temporary

expedient. The producer who meets the present price levels with lower costs without wage reductions through plant efficacy is going to be in a far stronger position to meet future developments than the producer who resorts to wage and salary cuts. He can still hold these in reserve.

Nor can it be assumed that present conditions will deter indefinitely the building of new plants. Wholly unneeded though they may be by every argument producers or ourselves may be able to use, if new plants can be built to produce the product required at less cost than present plants, *they will be built* regardless. Who knows now that the cost can be lowered materially by new plants—enough so that a profit can be made at present prices? But we are absolutely certain that every effort and every spark of ingenuity many business men and engineers possess will be directed to that end. It always has been so. Radically lower prices inevitably force lower costs, even by radical developments, where these are possible.

Doubtless new plants will be built by present producers to replace plants now definitely made obsolete by present price levels. They will if producers are alive to what situations like this actually mean to their industry. It is idle now to complain about the foolishness that brought on this crisis. To us it would seem better and wiser to have allowed evolution in the industry to have proceeded in an orderly way. But the crisis is here, and must be met. It calls for the scrapping of much out-of-date equipment, just as it has already necessitated the scrapping of price structures and long established business practices.

Business Is Still Far From Science

Prohibition is not the only issue upon which American public opinion seems hopelessly divided. The possibility of price maintenance or control by "artificial" methods is another. It would seem that a majority of business men in the rock products industries at least shy at any suggestion of government supervision of prices, however remote. If business cannot govern itself, or clean its own house, it is useless to look for help from the outside, is the burden of many a business man's point of view. It is entirely feasible for governments to fix hours of labor and minimum wage scales, to tax profits and income; but it is abhorrent for government to attempt any control of sales prices, or insure that there will be profits on which to pay taxes.

This distaste for government help in price maintenance undoubtedly arises from many causes; one is the entire lack of faith business men have in the ability, capacity and possibly the integrity of the politicians who constitute the government; another apparently is a deep-seated desire to keep a certain amount of the gambling element in business, always in hope of some day "making a big killing." With business men's doubt of politicians' capacity to intelligently exercise any control of business we are in entire sympathy. We have all too many examples of the type of Senator Norris. Yet the ultimate answer to this is to interest more men of business capacity in politics. With a desire to maintain a certain element of gambling in business, to make it more interesting, we have very little sympathy. We think business has outgrown that stage of evolution. Business men nowadays seldom have the opportunity to gamble with property entirely their own. Their stockholders and employes are to be considered. Managers are rather trustees, and it is hardly moral for them to gamble with the jobs and fortunes of those who trust them with the management of their means of livelihood.

And yet, without some kind of government or quasi-government supervision, any attempt to stabilize prices over any considerable period by voluntary efforts is hopeless. We can have the finest set of business principles in the world, or the nicest code of ethics, but unless 100% of the producers in an industry not merely accept them, but live up to them, we shall continue to have business upsets. Some producers, presumably, will always refuse to even read our fine principles and codes; some will violate them from ignorance; some from wilfulness. To expect all will continually live up to them is like expecting we shall no longer need jails because all of us are normal. Both are to be devoutly wished and worked for, but are not to be considered practicable solutions of pressing problems and conditions.

Another issue upon which American business men are hopelessly divided concerns the truth or falsity of the economic theory that high wages give buying power and make prosperity. Quite a few believe that the correct theory is the reverse; that is, prosperity makes high wages. One side may be called inflationists, the other deflationists; or the believers in the new theory vs. the believers in the old. Such a proposition ought to be capable of scientific analysis and proof. Doubtless some day we shall have it. At the present moment, however, these conflicting theories of economics, so vital to meeting effectively emergencies like the present, are as much matters of faith and sentiment as are our opinions on the efficacy or desirability of the 18th amendment.

All this goes to prove that business and industry are still very far from sciences. If they are subject to the physical laws of action and reaction, or the moral law of retribution for mistakes and sins committed, these laws certainly are not determined or stated so as to be grasped by men of much more than ordinary intelligence; and business has not progressed to the point where such principles or laws are applied to any degree. Under such conditions one finds it difficult to disagree with the "naturalist," who sees the only solution of economic and business problems in "let nature take its course."

However, we used to do that in the propagation of agricultural products, and domestic animals, but scientists eventually developed some of the laws of heredity and evolution—and we have very greatly improved agriculture and livestock as a result. We used to let nature take its course in the case of human sickness and disease, but scientists discovered some of the causes of disease and have succeeded materially in assisting nature in combating it. So it is a fair hope that some truths may be discovered in the economics of industry.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[27]	4-20-31	95	100	
Alpha P. C. new com.[2]	4-20-31	13	15	25c qu. Apr. 25
Alpha P. C. pfd.	4-18-31	115	122	1.75 qu. Mar. 14
Amalgamated Phosphate Co. 6's 1936[19]	4-18-31	99½	100½	
American Aggregates com.[19]	4-18-31	5	10	75c qu. Mar. 1
American Aggregates pfd.[19]	4-18-31	73	.....	1.75 qu. Apr. 1
American Aggr. 6's w.w.[19]	4-18-31	73⅛	77	
American Aggr. 6's ex. w.[19]	4-18-31	70⅛	74⅛	
American Brick Co., sand-lime brick	10- 6-30	4½	.....	25c qu. Feb. 1, '30
American Brick Co. pfd.	4- 6-31	60	.....	50c qu. May 1, '30
Am. L. & S. 1st 7's[27]	4-20-31	97	98	
American SilicaCorp. 6½'s[20]	4-22-31	No market		
Arundel Corp. new com.	4-21-31	38	38¾	75c qu. Apr. 1
Beaver P. C. 1st 7's[20]	4-16-31	88	90	
Bessemer L. & C. Cl. A[4]	4-17-31	30	.....	75c qu. May 1
Bessemer L. & C. 1st 6½'s[4]	4-17-31	85	89	
Bloomington Limestone 6's[27]	4-20-31	53½	55	
Boston S. & G. new com.[37]	4-18-31	10	14	30c qu. Apr. 1
Boston S. & G. new 7% pfd.[37]	4-18-31	40	45	87½c qu. Apr. 1
California Art Tile A	4-17-31	.....	5½	43¾c qu. Mar. 31
California Art Tile B[40]	4-17-31	.....	3	20c qu. Mar. 31
Calaveras Cement com.	4-17-31	5	10	
Calaveras Cement 7% pfd.	4-17-31	.....	83	1.75 qu. Apr. 15
Canada Cement com.	4-21-31	13½	14	
Canada Cement pfd.	4-21-31	94⅞	95	1.62½ qu. Mar. 31
Canada Cement 5½'s[34]	4-17-31	101¾	102½	
Canada Cr. St. Corp. bonds[34]	4-17-31	89	94	
Certainteed Prod. com.	4-21-31	4½	4¾	
Certainteed Prod. pfd.	4-21-31	20	25	1.75 qu. Jan. 1
Cleveland Quarries	4-21-31	.....	60	75c qu. 25c ex. Mar. 1
Columbia S. & G. pfd.	4-21-31	93	96	
Consol. Cement 1st 6½'s, A[44]	4-22-31	28	31	
Consol. Cement notes, 1941[23]	4-22-31	25	29	
Consol. Cement pfd.[27]	4-20-31	50	60	
Consol. Oka S. & G. 6½'s[12] (Canada)	4-18-31	99	101	
Consol. Rock Prod. com.[9]	4-16-31	75c	1	
Consol. Rock Prod. pfd.[9]	4-16-31	3½	4	43¾c qu. June1,'30
Consol. Rock Prod. units	4-18-31	9	10	
Consol. S. & G. pfd. (Can.)	4-21-31	.....	74	1.75 qu. Feb. 16
Construction Mat. com.	4-21-31	7	8½	
Construction Mat. pfd.	4-21-31	24½	26	87½c qu. May 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[35]	4-16-31	73	80	
Coosa P. C.1st 6's[27]	4-20-31	51	53	
Coplay Cem. Mfg. 1st 6's[33]	4-18-31	95	.....	
Coplay Cem. Mfg. com.[33]	4-18-31	5	7½	
Coplay Cem.Mfg. pfd.[33]	4-18-31	25	40	
Dolese & Shepard	4-21-31	50	55	$1 Apr. 1
Dufferin Pav. & Cr. Stone com.	4-21-31	6½	7	
Dufferin Pav. & Cr. Stone pfd.	4-21-31	70	75	1.75 Apr. 1
Edison P. C. com.[32]	4-17-31	50c	.....	
Edison P. C. pfd.[32]	4-17-31	2½	.....	
Federal P. C. 6½'s, 1941[19]	4-18-31	96	100	
Giant P. C. com.[2]	4-20-31	10	17	
Giant P. C. pfd.[2]	4-20-31	22	27	1.75 s.-a. Dec. 15
Gyp. Lime & Alabastine, Ltd.	4-21-31	9⅛	9¼	20c qu. Apr. 1
Hermitage Cement com.[11]	4-18-31	15	25	
Hermitage Cement pfd.[11]	4-18-31	75	81	
Ideal Cement, new com.	4-21-31	40	45	75c qu. Mar. 31
Ideal Cement 5's, 1943	4- 8-31	98	100	
Indiana Limestone com.[27]	4-20-31	3	6	
Indiana Limestone 6's	4-21-31	50	52⅛	
International Cem. com.	4-21-31	42¼	42¾	$1 qu. Mar. 31
International Cem. bonds 5's	4-21-31	94¾	95	Semi-ann. int.
Iron City S. & G. bonds 6's[30]	4- 6-31	88	92	
Kelley Is. L. & T. new stock	4-21-31	30½	32	62½c qu. Apr. 1
Ky. Cons. St. V. T. C.[25]	4-17-31	6	8	
Ky. Cons. Stone 6½'s	4-17-31	80	85	
Ky. Cons. Stone com.	4-21-31	5	5½	
Ky. Cons. Stone pfd.	4-21-31	75	85	1.75 qu. Feb. 1
Ky. Cons. Stone, trustee ctfs.	4-17-31	75	80	
Ky. Rock Asphalt com.[11]	4-18-31	5	6	40c qu. Oct. 1, '30
Ky. Rock Asphalt pfd.[11]	4-18-31	75	80	1.75 qu. Mar. 1
Ky. Rock Asphalt 6½'s[11]	4-18-31	97	100	
Lawrence P. C.[2]	4-20-31	51	56	$1 qu. Mar. 31
Lawrence P. C. 5½'s, 1942[2]	4-20-31	86	89	
Lehigh P. C.	4-21-31	14	14½	25c qu. May 1
Lehigh P. C. pfd.	4-21-31	100¼	101	1.75 qu. Apr. 1
Louisville Cement[7]	4-16-31	175	225	
Lyman-Richey 1st 6's, 1932[13]	4-17-31	98	.....	
Lyman-Richey 1st 6's, 1935[13]	4-17-31	95	.....	
Marblehead Lime 6's[24]	4-17-31	No market		
Marbelite Corp. com. (cement products)	4- 4-31	75c	.....	
Marbelite Corp. pfd.	4-17-31	4	.....	50c qu. Oct. 10,'30
Material Service Corp.	4-21-31	22	24¼	50c qu. Mar. 1
McCrady-Rodgers 7% pfd.[22]	4-16-31	45	.....	87½c qu. Mar. 30
McCrady-Rodgers com.[22]	4-16-31	.....	21½	75c Jan. 26
Medusa Portland Cement	4-21-31	.....	63	75c qu. Apr. 1
Michigan L. & C. com.[6]	4-18-31	45	.....	
Missouri P. C.	4-21-31	25½	26	50c qu. Jan. 31
Monolith Portland Midwest[9]	4-16-31	1¾	2½	
Monolith P. C. com.[9]	4-16-31	3	4	40c s.-a. Jan. 1
Monolith P. C. pfd.[9]	4-16-31	4	5	40c s.-a. Jan. 1
Monolith P. C. units[9]	4-16-31	10	12	
Monolith P. C. 1st Mtg. 6's[9]	4-16-31	75	80	
National Cem. (Can.) 1st 7's[34]	4-17-31	99½	100½	
National Gypsum A com.	4-21-31	5	5½	
National Gypsum pfd.	4-21-31	45	47	$1 Apr. 1
Nazareth Cement com.[25]	4-20-31	15	.....	
Nazareth Cement pfd.[25]	4-20-31	96	.....	
Newaygo P. C. 1st 6½'s[27]	4-20-31	101	.....	
New England Lime 1st 6's[10]	4-18-31	.....	60	
N. Y. Trap Rock 1st 6's	4-20-31	100⅜	.....	
N. Y. Trap Rock 7% pfd.[20]	4-20-31	95	.....	1.75 Apr. 1
North Amer. Cem. 1st 6½'s	4-21-31	48	.....	
North Amer. Cem. com[27]	4-20-31	50c	2	
North Amer. Cem. 7% pfd.[27]	4-20-31	11	22	
North Shore Mat. 1st 5's[15]	4-22-31	90	.....	
Northwestern States P. C.[21]	4-18-31	95	.....	$2 Apr. 1
Ohio River Sand com.	4-21-31	.....	14	
Ohio River Sand 7% pfd.	4-21-31	.....	98	
Ohio River S. & G. 6's[16]	4-18-31	85	.....	
Oregon P. C. com.[9]	4-16-31	9	13	
Oregon P. C. pfd.[9]	4-16-31	80	90	
Pacific CoastAggr. com.[40]	4-17-31	.....	2	
Pacific Coast Aggregates pfd.	4-18-31	2½	3½	
Pacific Coast Cement 6's[8]	4-16-31	65	74½	
Pacific P. C. com.	4-17-31	12	.....	
Pacific P. C. pfd.	4-17-31	.....	72½	1.62½ qu. Apr. 4
Pacific P. C. 6's[5]	4-16-31	97¾	99¼	
Peerless Cement com.[1]	4-17-31	2	3¼	
Peerless Cement pfd.[1]	4-17-31	65	70	1.75 qu. Apr. 1
Penn.-Dixie Cement com.	4-21-31	3½	3¾	
Penn.-Dixie Cement pfd.	4-21-31	14⅛	20	
Penn.-Dixie Cement 6's	4-21-31	65	.....	
Penn. Glass Sand Corp. 6's	4- 8-31	100½	103	
Penn. Glass Sand Corp. pfd.	4- 8-31	90	.....	1.75 qu. Apr. 1
Petoskey P. C.	4-21-31	6½	7½	15c qu. Apr. 1
Port Stockton Cem. com.[9]	4-16-31	No market		
Riverside Cement com.	4-17-31	.....	11	
Riverside Cement pfd.[20]	4-16-31	65	70	1.50 qu. May 1
Riverside Cement, A[20]	4-16-31	10	12	15c qu. Feb. 1
Riverside Cement, B[20]	4-16-31	2	3	
Roquemore Gravel 6½'s[17]	4-18-31	98	100	
Sandusky Cement 6½'s, 1931-37[19]	4-18-31	90	100	
Santa Cruz P. C. com.[5]	4-16-31	85½	90½	$1 qu. Apr. 1
Schumacher Wallboard com.	4-17-31	8⅛	11	25c qu. Mar. 27
Schumacher Wallboard pfd.	4-17-31	.....	23½	50c qu. May 15
Southwestern P. C. units[35]	4-16-31	240	.....	
Standard Paving & Mat. (Canada) com.	4-21-31	10	12	50c qu. Feb. 16
Standard Paving & Mat. pfd.	4-21-31	.....	77	1.75 qu. Feb. 16
Superior P. C., A	4-17-31	35	36	27½c mo. May 1
Superior P. C., B	4-17-31	10½	13	25c qu. Mar. 20
Trinity P. C.units[31]	4-18-31	105	.....	
Trinity P. C. com.[31]	4-18-31	17½	30	
Trinity P. C. pfd.[27]	4-20-31	109	112	
U. S. Gypsum com.	4-21-31	43	43½	40c qu. Mar. 31
U. S. Gypsum pfd.	4-21-31	128	130	1.75 qu. Mar. 31
Wabash P. C.[21]	4-20-31	.....	22	
Warner Co. com.[16]	4-18-31	26	31	50c qu. Apr. 15
Warner Co. 1st 7% pfd.[16]	4-18-31	96	97	1.75 Apr. 1
Warner Co. 1st 6's w.w.	4-21-31	93	.....	
Whitehall Cem. Mfg. com.[30]	4-20-31	80	.....	
Whitehall Cem. Mfg. pfd.[30]	4-20-31	50	.....	
Wisconsin L. & C. 1st 6's[15]	4-22-31	90	.....	
Wolverine P. C. com.	4-21-31	2¾	.....	15c qu. Nov. 15
Yosemite P. C., A com.[9]	4-16-31	2	2½	

Quotations by: [1]Watling Lerchen & Hayes Co., Detroit, Mich. [2]Bristol & Willett, New York. [3]Rogers, Tracy Co., Chicago. [4]Butler, Beadling & Co., Youngstown, Ohio. [5]Smith, Camp & Co., San Francisco, Calif. [6]Frederic H. Hatch & Co., New York. [7]J. J. B. Hilliard & Son, Louisville, Ky. [8]Dillon, Read & Co., Chicago, Ill. [9]A. E. White Co., San Francisco, Calif. [10]Lee Higginson & Co., Boston and Chicago. [11]J. W. Jakes & Co., Nashville, Tenn. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Stern Bros. & Co., Kansas City, Mo. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Citizens Southern Co., Savannah, Ga. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hewitt, Ladin & Co., New York. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simonds & Co., Inc., Detroit, Mich. [22]Peoples-Pittsburgh Trust Co., Pittsburgh, Penn. [23]A. B. Leach & Co., Inc., Chicago, Ill. [24]Richards & Co., Philadelphia, Penn. [25]Hincks Bros. & Co., Bridgeport, Conn. [26]Bank of Republic, Chicago, Ill. [27]National City Co., Chicago, Ill. [28]Chicago Trust Co., Chicago, Ill. [29]Boettcher & Co., Denver, Colo. [30]Hanson and Hanson, New York. [31]S. F. Holzinger & Co., Milwaukee, Wis. [32]Tobey and Kirk, New York. [33]Steiner, Rouse and Co., New York. [34]Jones, Heward & Co., Montreal, Que. [35]Tenney, Williams & Co., Los Angeles, Calif. [36]Stein Bros. & Boyce, Baltimore, Md. [37]Wise, Hobbs & Arnold, Boston. [38]E. W. Hays & Co., Louisville, Ky. [39]Blythe Witter & Co., Chicago, Ill. [40]Martin Judge Co., San Francisco, Calif. [41]Hemphill, Noyes & Co., New York City. [42]Nesbitt, Thomas & Co., Montreal. [43]Foreman State-National Bank, Chicago. [44]E. H. Rollins, Chicago.

Financial Set-Up of New American Silica-Sand Corp.

UNDER DATE of March 26, 1931, the protective committee of the American Silica Corp., in a letter to holders of company's first mortgage 6½s, announced that it had prepared a plan of reorganization for the company which was adjudged bankrupt on December 22, 1930, at which time Fred E. Hummel of Chicago was appointed receiver. On January 9, 1931, the receiver was appointed trustee in bankruptcy. The committee bid in the property on February 6, 1931, and caused to be organized a new company, American Silica-Sand Co. in Delaware on February 16, 1931, to own in fee all properties of the old company. A wholly owned subsidiary, the American Silica Refining Co., was formed to take title to leasehold properties of the old company.

Authorized capitalization of the new American Silica-Sand Co. will be as follows: $150,000 first mortgage and collateral 6% notes, $966,500 general and collateral 6% income bonds and 25,000 no par shares of capital stock, of which $50,000 of the first mortgage notes, $961,500 of the income bonds and 19,500 shares of stock will be outstanding.

Under the plan holders of certificates of deposit will receive in exchange for each $1000 par value of certificates a like amount of general income bonds and 10 shares of common stock of the new company. Holders of the $5000 of bonds not deposited under the agreement may participate in the plan upon deposit of their holdings on or before June 1, 1931.

Unless depositors file written dissent from the plan or withdraw prior to April 27, 1931, they will be deemed to have assented to the plan.

The income bonds will be dated March 1, 1931, and mature March 1, 1951. Interest shall be paid at rate of 6% per annum in so far as surplus net earnings, as defined in the indenture, will permit, and such interest at rate of 6% shall become cumulative on and after January 1, 1933. A sinking fund beginning 1933 is also provided.

Proceeds from sale of the first mortgage notes will be used to pay reorganization expenses and provide working capital for the new company.

The management of the new company is: W. S. Walker, president; C. J. Niesen, vice-president, Ottawa, Ill.; S. S. Hawes, secretary and treasurer, Chicago, Ill. Directors: C. E. Driver, J. Sanford Otis, S. S. Harris, Chicago; W. S. Walker, C. J. Niesen, Ottawa, Ill

Pennsylvania-Dixie Cement Earnings for Year Ending March 31

THE Pennsylvania-Dixie Cement Corp. reports for 12 months ended March 31, 1931, net income of $467,202 after depreciation, depletion, interest and federal taxes, equivalent to $3.44 a share on 135,888 shares of 7% preferred stock. This compares with $329,136 or $2.42 a share on preferred for the 12 months ended March 31, 1930.

Consolidated income account for 12 months ended March 31, 1931, compares as follows:

	1931	1930
Operating profit	$2,594,627	$2,479,723
Depreciation and depletion	1,381,716	1,393,314
Interest	657,754	700,285
Federal taxes	87,955	56,988
Net profit	$467,202	$329,136

Consolidated balance sheet of Pennsylvania-Dixie Cement Corp. and subsidiaries as of March 31, 1931, compares as follows:

ASSETS

	1931	1930
†Land, buildings, machinery and equipment	$23,999,732	$24,987,226
Cash	2,189,885	1,851,841
Short term securities	552,000	.....
Notes and accounts receivable	633,392	654,789
Inventories	3,055,380	3,135,590
Miscellaneous investments	344,547	427,910
Insurance fund, etc.	186,409	129,740
Deferred charges	40,646	33,153
Total	$31,001,991	$31,220,249

LIABILITIES

Preferred stock	$13,588,800	$13,588,800
*Common stock	4,000,000	4,000,000
Gold bonds	10,630,000	11,353,000
Accounts payable	145,760	222,853
Accrued taxes, interest, etc.	135,293	166,652
Federal tax reserve	117,624	70,143
Other reserves	92,208	93,972
Surplus	2,292,306	1,724,829
Total	$31,001,991	$31,220,249

*Represented by 400,000 no-par shares. †After depreciation and depletion.

Recent Dividends Announced

Bessemer Limestone and Cem. Cl. A. (qu.)	$0.75,	May	1
Eastern Magnesia Talc. com. (qu.)	0.50,	Mar.	30
Riverside Cement 1st pfd. (qu.)	1.50,	May	1

Alpha Cement Earnings for Year Ended March 31

THE Alpha Portland Cement Co. reports for 12 months ended March 31, 1931, net income of $1,198,812 after depreciation and federal taxes, equivalent after 7% preferred dividends, to $1.49 a share on 711,000 no-par shares of common stock. This compares with $1,654,098 or $2.13 a share in preceding 12 months.

Surplus account follows: Earned surplus April 1, 1930, $3,753,735; add: Net income for 12 months ended March 31, 1931, $1,198,812; total surplus, $4,952,547; deduct: Preferred dividends $140,000; common dividends $1,244,250; additional depreciation for year 1928 as adjusted by Treasury Department $32,366; provision for additional federal taxes prior years $200,000; adjustment of sack inventory to market value at December 31, 1930, $95,657; earned surplus March 31, 1931, $3,240,274.

Consolidated income account for 12 months ended March 31 compares as follows:

	1931	1930
Net sales	$9,580,011	$11,183,880
Operating expense	7,025,224	8,279,150
Depreciation	1,345,253	1,307,497
Operating profit	$1,209,534	$1,597,233
Other income (net)	159,278	281,865
Total income	$1,368,812	$1,879,098
Federal taxes	170,000	225,000
Net income	$1,198,812	$1,654,098
Preferred dividends	140,000	140,000
Common dividends	1,244,250	2,133,000
Deficit	$185,438	$618,902

Consolidated balance sheet is as follows:

ASSETS

	1931	1930
*Land, buildings, machinery, equipment, etc.	$20,757,927	$21,774,004
Cash	4,535,142	1,873,677
Call loans	.....	100,000
Certificates of deposit	125,000	2,500,000
U. S. government bonds, etc.	1,861,200	1,362,975
Working funds, advertising, etc.	202,807	186,123
Accounts and notes receivable	524,983	511,841
Inventories	2,423,555	3,039,085
Miscellaneous investments	290,055	273,039
Deferred items	196,782	155,925
Total	$30,917,451	$31,776,669

LIABILITIES

7% preferred stock	$2,000,000	$2,000,000
†Common stock	24,134,500	24,134,500
Accounts payable	274,427	424,686
Federal tax, etc.	177,812	210,519
Dividends payable	177,750	533,250
Reserves	912,688	719,979
Earned surplus	3,240,274	3,753,735
Total	$30,917,451	$31,776,669

*After depreciation, depletion, etc. †Represented by 711,000 no-par shares.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
American Portland Cement,[3] 100 shs., par $10	$100 for the lot	.....
American Portland Cement,[3] 400 shs., par $10	$400 for the lot	.....
American Portland Cement,[3] 100 shs., par $10	$75 for the lot	.....
Atlantic Gypsum Products 1st 6s, 1941 ($28,000)[2]	$7400 for the lot	.....
Blue Diamond Materials, 10 shs. pfd.[8]	$10 for the lot	.....
Florida Portland Cement (Del.),[3] 50 shs. com., no par and 50 pfd.	$450 for the lot	.....
Florida Portland Cement, 10 shs. pfd. and 5 shs. com.[6]	$100 for the lot	.....
Holliston Trap Rock pfd.,[12] 100 shs.; per sh.	$95	.....
Indiana Limestone, 200 shs. pfd. and 1000 com., no par[4]	$2000 for the lot	.....

Stock	Price bid	Price asked
Rockland and Rockport Lime, 330 shs. pfd., 85 2nd pfd. and 135 com.[10]	$55 for the lot	.....
Rockland and Rockport Lime Corp., 50 shs. 1st pfd.[11]	$40 for the lot	.....
Standard Rock Asphalt, 1200 shs. no par stock[4]	1¼	.....
Tory Hill Sand and Gravel, 13 shs. 8% pfd.[5]	$1 for the lot	.....
Tory Hill Sand and Gravel, 13 shs. com., no par[5]	$1 for the lot	.....
United Feldspar, 388 shs. pfd., 647 com.[9]	$1000 for the lot	.....
Universal Gypsum, 100 trustees cert., no par[7]	$1 for the lot	.....
Universal Gypsum, 500 shs. com., no par[9]	$12 for the lot	.....
Universal Gypsum and Lime, 300 shs.[1]	$4 for the lot	.....
Universal Gypsum and Lime, 200 shs.[1]	$2 for the lot	.....
Vulcanite Portland Cement, 300 shs. com., no par[3]	$425 for the lot	.....

[1]Price at auction by Adrian H. Muller & Son, New York, August 6, 1930. [2]Price at auction by Adrian H. Muller & Son, New York City, November 19, 1930. [3]Price at auction by Adrian H. Muller & Son, New York City, December 10, 1930. [4]Price at auction, Adrian H. Muller & Son, December 24, 1930. [5]Price at auction, R. L. Day & Co., Boston, December 17, 1930. [6]Price at auction. Barnes & Lofland, Philadelphia, December 17, 1930. [7]Price at auction, A. J. Wright & Co., Buffalo, December 17, 1930. [8]Price at auction, Adrian H. Muller & Son, December 17, 1930. [9]Price at auction. Adrian H. Muller & Son, December 31, 1930. [10]Price at auction, R. L. Day & Co., December 31, 1930. [11]Price at auction, Wise, Hobbs & Arnold, Boston, December 31, 1930. [12]Price at auction, Wise, Hobbs & Arnold, Boston, March 11, 1931.

Coronet Phosphate Co. Statement

THE COMPARATIVE income accounts of the Coronet Phosphate Co., Tampa, Fla., for the years December 31, 1930, and 1929, are reported as follows:

	1930	1929
Gross revenue	$ 995,647	$1,226,623
Operating expense, etc.	†644,942	867,301
Depreciation and depletion	182,336	190,043
Operating income	168,369	169,279
Fixed charges, etc.	17,289	23,544
Federal taxes	17,961	13,458
Net income	133,119	132,277
Dividends	150,000	112,500
Surplus	*16,881	*19,777
Earned per share	5.32	5.29

Number of shares, 25,000.

*Deficit.
†Includes $74,787 research and experimental expenses.

BALANCE SHEET OF THE CORONET PHOSPHATE CO.
(As of December 31, 1930)

Assets:	1930	1929
Phosphate lands	$2,217,684	$2,193,665
Plant equipment	1,773,853	1,954,588
Interest in furnaces	405,279	.....
Current assets:		
Inventories	270,406	314,977
Notes receivable	6,614	6,490
Accounts receivable	71,738	220,197
Cash	197,875	242,796
Sinking fund	841	66,209
Deferred assets	41,651	48,439
Total	$4,985,941	$5,047,361
Liabilities:		
Capital stock	$2,500,000	$2,500,000
Bonded debt	243,000	386,000
Current liabilities:		
Accounts payable	9,349	16,550
Accrauls	7,290	11,580
Federal tax reserve	17,961	13,458
Dividends payable	37,500	37,500
Reserve for sinking fund	.....	66,084
Reserve for depreciation, etc.	1,341,887	1,170,352
Surplus	828,955	845,836
Total	$4,985,941	$5,047,361
Current assets	$ 547,475	$ 850,664
Current liabilities	72,100	145,172
Working capital	$ 475,375	$ 705,491

Ideal Cement Co.'s Annual Statement

ACCORDING to the annual report to stockholders of the Ideal Cement Co., Denver, Colo., by Charles Boettcher, president, the total sales of cement and the net earnings of the company were approximately the same as during the preceding year—despite the fact that the sales of cement in the territory supplied from the Colorado plants showed a substantial reduction in comparison with the year 1929.

Satisfactory progress is being made in all of the company's plants in the reduction of manufacturing costs.

The outlook is favorable for maintaining a normal volume of business in the territories served by the Oklahoma and Arkansas plants. These two plants have secured contracts for over 2,500,000 bbl. of cement to be used on road work in the states of Arkansas, Louisiana and Oklahoma. The capacity of the company's plant in Arkansas has been somewhat increased to take care of the larger amount of cement which will be used for public roads.

Very little of the company's reserve supply of natural gas at its Oklahoma field was used during the past year, as the company has continued to take advantage of a supply of cheap gas from other producers and to conserve its own supply.

The company has recently completed another gas well on its property, so that the present capacity of the wells is approximately 125,000,000 cu. ft. per day. It is anticipated that this potential production will be increased by bringing in another well early this spring. The company, therefore, will soon begin the use of its own gas which will bring about a reduction of over $400,000 per year in the cost of fuel.

The company's plant at Portland, Colo., has entered into a contract for a 15-year supply of natural gas for that plant. The pipe line has been laid and the use of this gas will commence about March 1 and will result in a substantial saving in fuel costs.

During the year waste-heat boilers were installed in the company's plant at Superior, Neb., and on or about September 1 last the company began using natural gas for fuel, and it is expected that the installation of waste-heat boilers with the use of natural gas as fuel will effect a considerable saving in manufacturing costs. The state of Nebraska has announced a comprehensive road program for 1931, and the company expects to obtain its share of this increased business.

The increase in the company's net working capital since the last annual report amounts to approximately $825,000.

CONSOLIDATED BALANCE SHEET OF THE IDEAL CEMENT CO. AND ITS SUBSIDIARY COMPANIES
(As of December 31, 1930)

ASSETS

Cash, industrial and municipal bonds and marketable securities		$6,286,941.39
Accounts receivable		464,186.77
Manufactured goods		571,948.33
Inventory, goods in process, supplies, fuel and sacks		1,738,531.84
Total current assets		$9,061,608.33
Deferred charges		65,267.15
Plants and properties		
Plants and equipment	$22,742,104.64	
Less depreciation	5,467,352.92	17,274,751.72
Land	$1,285,304.02	
Less depletion	100,394.62	1,184,909.40
Total		$27,586,536.60

LIABILITIES AND CAPITAL

Liabilities		
Accounts payable	$122,374.71	
Accrued liabilities	399,204.86	
Total current liabilities		$521,579.57
15-year 5% convertible gold debentures outstanding		4,146,000.00
Reserves		104,163.27
Stock of sub-companies not owned		10,976.04
Capital		
Surplus represented by 458,271 shares of no par value common stock		22,803,817.72
Total		$27,586,536.60

EARNINGS STATEMENT

Net earnings from operation after depreciation and federal income taxes	$1,690,515.45
Miscellaneous earnings aside from cement manufacture	323,401.03
	$2,013,916.48
Less interest paid on debentures	207,300.00
Balance of net earnings available for surplus and common stock dividends	$1,806,616.48

Equivalent to $3.942 per share on 458,271 shares of no par value common stock outstanding during the year.

Consolidated Oka Sand and Gravel Co., Ltd. (Canada)

THE ANNUAL income account of the year ended December 31, 1930, of the Consolidated Oka Sand and Gravel Co., Toronto, Ont., compared with the statement of the previous year, is reported as follows:

	1930	1929
Total sales	$ 613,344	$ 778,870
Operating profit	158,261	202,884
Depreciation	43,908	37,815
Organization expenses	2,878	2,247
Special depreciation on barges	.....	10,000
Interest charges	45,348	45,500
Sinking fund	.....	2,333
Reserve for bad debts	.....	4,284
Reserve for allowances	2,000	3,100
Net income	64,127	97,605
Preferred dividends	49,119	49,252
Surplus	$ 15,008	$ 48,353
Earned per share, common	0.71	2.30

Number of common shares, 21,000.

BALANCE SHEET OF CONSOLIDATED OKA SAND AND GRAVEL CO.
(As of December 31, 1930)

Assets:	1930	1929
*Fixed assets	$1,785,582	$1,701,399
Current assets:		
Cash	49,212	3,481
Accounts receivable (net)	70,025	68,089
Inventories	89,594	98,862
Due from dir. and office	.....	12,400
Deferred charges	15,036	46,434
Prepayments	20,071	.....
Total	$2,029,520	$1,930,665
Liabilities:		
Preferred stock	$ 701,700	$ 701,700
†Common stock	352,884	370,884
Funded debt	686,000	700,000
Current liabilities:		
Accounts payable and accruable	80,340	89,378
Preferred dividends	12,280	12,280
Bank loan	45,000	.....
Reserve for discount and claims	2,324	3,100
Sinking fund reserve	.....	2,333
Deferred purchasing liabilities	85,000	.....
Surplus	63,992	50,990
Total	$2,029,520	$1,930,665
Current assets	$ 208,832	$ 182,832
Current liabilities	137,619	101,658
Working capital	$ 71,213	$ 81,174

*After depreciation: 1930, $97,852; 1929, $53,945.
†Represented by 21,000 no par shares.

Schumacher Wall Board Corp.

THE Schumacher Wall Board Corp., San Francisco, Calif., declared an initial quarterly dividend of 25 cents a share on common stock, payable March 27 to stock of record March 17. This places the stock on a $1 annual basis.

Working control of the company is held by Paraffine Companies, Inc., whose holdings on June 30, last, were 15,500 common shares, or 23.5% of the 66,000 common shares outstanding. Since that date, Paraffine has augmented its investment in this company.

R. H. Shainwald, president, commenting on the action of directors in Los Angeles recently, said:

"The company's operations are proceeding satisfactorily, to the extent that all directors felt that dividend action was justifiable, at this time."

For the year ended April 30, 1930, the company reported net profit of $163,207, equal, after preferred dividends of $66,000, to $1.47 a share on 66,000 shares of common. Preferred dividends at the annual rate of $2 a share were inaugurated Nov. 15, 1926.

Material Service Corp.'s Statement

REFLECTING the reduced activity in the building industry last year, the consolidated net income of the Material Service Corp., Chicago, Ill., for the year ended December 31, 1930, amounted to only $265,040, after all charges including federal taxes, in comparison with $417,994 in the preceding twelve months. The 1930 net was equal to $2.12 a share on the 125,000 shares of no par value outstanding, against $3.34 a share in 1929.

Current assets at the end of 1930 aggregated $2,222,869 and current liabilities totaled $1,312,385, against $1,384,361 and $879,099, respectively, a year earlier. Cash and marketable securities as of December 31 last aggregated $234,011.

CONSOLIDATED INCOME ACCOUNT OF THE MATERIAL SERVICE CORP.
(Year ended December 31, 1930)

	1930	1929
Sales	$7,571,465	$9,202,813
Cost of sales, including depreciation	7,266,425	8,734,819
Other income	305,040	467,994
Federal taxes	40,000	50,000
Net income	265,040	417,994
*Earned per share	2.12	3.34

*Based on 125,000 shares of no par value.

CONSOLIDATED BALANCE SHEET OF THE MATERIAL SERVICE CORP.
(As of December 31, 1930)

	1930	1929
Current assets	$2,222,869	$1,384,361
Fixed assets	2,689,483	3,087,517
Investment including treasury stock and special accounts	383,151	281,612
Goodwill	1	1
Deferred charges and pre-payments	230,000	211,407
Options	.....	18,900
Total assets	$5,525,505	$4,983,798
Liabilities:		
Current liabilities	$1,312,385	$ 879,099
Capital stock	1,250,000	1,250,000
Capital surplus	1,039,784	1,243,291
Power and Light surplus	1,511,543	1,496,003
Purchases monthly obligatory	45,460	90,405
Minority interest	25,000	25,000
Six per cent notes	341,333	.....
Total liabilities	$5,525,505	$4,983,798

In his remarks to stockholders Henry Brown, president, pointed out that none of the facilities completed late in 1929 were used to any point approaching capacity last year. At the annual meeting all retiring officers and directors were re-elected.—*Chicago* (Ill.) *Journal of Commerce.*

National Gypsum Co.'s Annual Balance Sheet

THE ANNUAL REPORT of M. H. Baker, president of the National Gypsum Co., Buffalo, N. Y., to stockholders contains the following:

Results from 1930 operations as disclosed by the accompanying income statement and balance sheet reflect an improvement from operations of $382,950.83 compared with 1929. This showing for the year is satisfactory when considered in connection with the depressed business conditions that existed throughout the year.

Net sales were ahead of 1929 and a substantial number of new accounts were added. During the year the company benefited from better prices, lower cost through manufacturing economies and the addition of new products.

Cash increased $87,326.45. Current assets at close of the year contained cash and equivalent in government bonds amounting to $477,522.71, or more than three times all current liabilities. The December 31, 1930, balance sheet reveals a ratio of current assets against current liabilities of more than seven to one.

Despite the severe curtailment in building satisfactory results were obtained for the first two months of this year and the organization is confident of further progress for 1931.

STATEMENT OF INCOME AND SURPLUS ADDITION, NATIONAL GYPSUM CO. AND SUBSIDIARY
(For the Year Ended December 31, 1930)

		1930	1929
Earnings from operations before bond interest, depreciation and depletion		$360,619.72	$*36,448.83
Depreciation and depletion		128,387.42	113,201.59
Net income before bond interest		$232,232.30	$*149,650.42
Interest on bonds		38,168.89	39,237.00
Income from operations		$194,063.41	$*188,887.42
Deduct — Special and extraordinary charges due to changes in products and in industry practices prior to 1930:			
Obsolete materials	$11,927.45		
Jute-bag obsolescence	60,882.99		
Provision for loss on discontinued products	69,288.81	142,099.25	
Net addition to surplus		$ 51,964.16	

*Deficit.

NOTE—No provision for federal income tax has been made, as prior losses may be carried forward for tax purposes.

BALANCE SHEET OF THE NATIONAL GYPSUM CO. AND SUBSIDIARY
(December 31, 1930)

ASSETS

Cash and certificates of deposit	$272,568.03	
Liberty bonds and accrued interest	201,958.33	
Accounts and notes receivable—less reserve	377,648.66	
Inventories	230,268.53	
Total currents assets		$1,082,443.55
Land, gypsum and lime deposits, buildings, machinery and equipment—less reserves		5,393,600.72
Patents and trade-marks—less amortization		53,827.54
Employes' stock subscriptions		35,537.50
Stripping expense and other deferred charges		187,865.39
Total assets		$6,753,274.70

LIABILITIES

Accounts and notes payable	$106,093.95	
Dividend payable January 2, 1931	26,295.65	
Accrued expense	19,450.19	
Total current liabilities		$ 151,839.79
Sinking fund gold bonds, 6%, due 1943		592,000.00
Long-term contracts		134,780.92
Mortgage on gypsum lands		37,292.00
Preferred stock, 26,295⅔ shares		2,629,566.67
Surplus and common stock, 148,175 1/6 shares		3,207,795.32
Total liabilities		$6,753,274.70

Pacific Coast Aggregates

AT THE ANNUAL MEETING of stockholders of Pacific Coast Aggregates, Inc., recently held, Charles M. Cadman, president, reported satisfactory progress for the company, even during the past year of business depression.

The company's total sales of all products for the year 1930 amounted to $3,174,788.15, comprised or rock, sand, gravel, building materials and fuel. Rock, sand and gravel sales, as reported by Mr. Cadman, totaled 38,279 carloads having a gross tonnage in excess of 2,500,000 tons. Gross profit from these operations amounted to $708,472.

The company's consolidated earnings, as reported were as follows:

Sales	$3,174,788.15
Production costs purchases, etc.	2,744,741.78
Net operating income	$ 430,046.37
Other income	54,497.94
Total income	$ 484,544.31
Bond interest	261,699.73
Balance income	$ 222,844.58
Debenture interest	105,858.74
Balance income, available for depreciation, etc.	$ 116,985.84

Consolidated balance sheet as of December 31, 1930, showed current assets amounted to $1,074,650.31 against which current liabilities totaled $323,076.08.

Plant properties, structures, etc., less depreciation and depletion reserves, were shown at $16,361,354, depreciation for the year amounting to $410,484.19.

Federal Portland Cement Co. Statement

THE EARNINGS of the Federal Portland Cement Co., Buffalo, N. Y., for the 11 months of 1930 to November 30, are reported as follows:

Sales	$1,479,351
Cost of sales	1,042,954
Selling, etc., expenses	147,557
Net earnings	288,841
Other income	10,242
Total income	299,083
Interest and other charges	67,757
Taxes	27,759
Balance	$ 203,569

Balance Sheet, as of July 31, 1930

Assets:	1930	1929
Buildings and equipment	$2,059,083	$2,125,116
Real estate	183,470	183,470
Current assets:		
Cash	55,654	23,525
Notes and accounts receivable	365,463	269,243
Inventories	553,031	538,069
Sinking fund	192	198
Deferred charges	129,759	170,965
Total	$3,346,652	$3,310,586
Liabilities:		
Preferred stock	$1,905,400	$1,905,400
†Common stock	20,000	20,000
Funded debt	707,000	749,500
Current liabilities:		
Accounts, notes, etc., payable	375,935	338,951
Cash deposit account	50,875	39,278
Interest payable	19,252	20,705
Tax reserve	18,781	5,903
Accruals, etc.	14,469	20,070
Surplus	234,940	210,779
Total	$3,346,652	$3,310,586
Current assets	$ 974,148	$ 830,837
Current liabilities	479,312	424,907
Working capital	$ 494,836	$ 405,930

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Mar. 21	Limestone Flux Week ended Mar. 28	Sand, Stone and Gravel Week ended Mar. 21	Sand, Stone and Gravel Week ended Mar. 28
Eastern	1,482	1,589	1,527	1,731
Allegheny	1,759	1,702	1,757	2,220
Pocahontas	187	203	659	828
Southern	788	650	6,762	6,860
Northwestern	1,004	975	1,074	1,086
Central Western	366	403	4,553	4,148
Southwestern	326	367	4,744	4,386
Total	5,912	5,889	21,076	21,259

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1930 AND 1931

District	Limestone Flux 1930 Period to date Mar. 29	Limestone Flux 1931 Period to date Mar. 28	Sand, Stone and Gravel 1930 Period to date Mar. 29	Sand, Stone and Gravel 1931 Period to date Mar. 28
Eastern	26,922	16,318	28,406	14,822
Allegheny	28,773	19,345	33,900	18,639
Pocahontas	2,584	1,344	7,584	6,404
Southern	7,742	6,982	77,800	73,233
Northwestern	6,869	4,698	13,957	11,280
Central Western	5,959	5,066	70,922	42,243
Southwestern	4,146	3,179	54,810	43,097
Total	82,995	56,932	287,379	209,718

COMPARATIVE TOTAL LOADINGS, 1930 AND 1931

	1930	1931
Limestone Flux	*82,995*	*56,932*
Sand, stone, gravel	*287,379*	*209,718*

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week of April 18:

SOUTHERN FREIGHT ASSOCIATION DOCKET

54621. **Sand**, Louisville, Ky., to Glencliff, Danley, Mimms, Antioch, Mt. View, Kimbro, Lavergne, Smyrna, Florence, Murfreesboro, South Pittsburg, Tenn., and Bridgeport, Ala. (N. C. & St. L. Ry.). It is proposed to cancel present specific commodity rates on molding sand, carloads, from Louisville, Ky., to Bridgeport, Ala., and South Pittsburg, Tenn., as provided in Agent Speiden's I. C. C. No. 1408, of $2.20 per net ton, and to apply in lieu thereof rate of $1.75 per net ton provided in Agent Glenn's I. C. C. A-655, which is at present applicable via Southern Ry., C. N. O. & T. P. Ry., Chattanooga, Tenn., and N. C. & St. L. Ry. It is also proposed to cancel present specific commodity rates on molding sand, carloads, from Louisville, Ky., to N. C. & St. L. Ry. stations, Glencliff, Tenn., to Murfreesboro, Tenn., inclusive, and to establish in lieu thereof rates on sand, carloads, of $1.58 per net ton based on the I. C. C. Docket 17517 scale, observing the Nashville, Tenn., rate of $1.58 as minimum.

54628. **Agricultural (ground) limestone**, carloads, Whitehead, Tenn., to stations on the N. C. & St. L. Ry. It is proposed to establish a scale of rates for application on agricultural (ground) limestone, carloads, minimum weight 60,000 lb., from Whitehead, Tenn., to N. C. & St. L. Ry. stations. Present and proposed rates from Whitehead, Tenn., to representative points of destination are as follows (in cents per net ton):

To	Pres.	Prop.
Huntsville, Ala.	174	120
Guntersville, Ala.	185	140
Gadsden, Ala.	185	150
Cowan, Tenn.	174	120
Tullahoma, Tenn.	174	130
Fayetteville, Tenn.	162	90

54715. **Crushed stone**, carloads, from Tyrone and High Bridge, Ky., to Augusta and Brooksville, Ky. At present, combination rates apply. It is proposed to establish rate on crushed stone, carloads (See Note 3), as described in Agent Glenn's Tariff 88-A, I. C. C. A-655, from Tyrone and High Bridge, Ky., to Augusta, Ky., 165c; Brooksville, Ky., 235c per net ton.

54763. **Chert, gravel, sand, slag, crushed stone**, etc., between stations on the S. A. L. Ry. and short line connections. It is proposed to amend the application of the rates on roadway material, viz., sand, gravel, crushed stone, chert and slag, as published in Seaboard Air Line Railway I. C. C. No. A-7448, to read as follows:

Territory J—Applicable between Seaboard Air Line Railway stations except not applicable from, to or between stations south of the line of the Seaboard Air Line Railway from Jacksonville, Fla., through River Junction, Fla.

From Chesterfield and Lancaster Railroad stations to Seaboard Air Line Railway stations, except not applicable to stations in Florida south of the line of the Seaboard Air Line Railway from Jacksonville, Fla., through River Junction, Fla.

Territory K—Applicable from Seaboard Air Line Railway stations in Florida south of the line of the Seaboard Air Line Railway from Jacksonville, Fla., through River Junction, Fla., to Seaboard Air Line Railway stations north of the line of the Seaboard Air Line Railway, from Jacksonville, Fla., through River Junction, Fla., except not applicable to stations in Florida.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Territory S—Applicable between Newport News, Va., and Seaboard Air Line Railway stations, except not applicable from or to stations in Florida south of the line of the Seaboard Air Line Railway from Jacksonville, Fla., through River Junction, Fla.

From Chesterfield and Lancaster Railroad stations to Newport News, Va. (See Item 12 of tariff.)

Territory T—Applicable from Seaboard Air Line Railway stations in Florida, south of the line of the Seaboard Air Line Railway, from Jacksonville, Fla., through River Junction, Fla., to Newport News, Va. (See Item 12 of tariff.)

54795. **Limestone, crushed**, carloads, from Alaco, Fla., to Apalachicola, Fla. (intrastate). Present rate, combination. Proposed rate on limestone, crushed, carloads (See Note 3), from Alaco, Fla., to Apalachicola, Fla. (intrastate), 175c per net ton.

54796. **Sand, burnt refuse of iron foundries**, carloads, from North Birmingham, Ala., to Birmingham, Ala. It is proposed to cancel, on the obsolete theory, the present rate on the above named commodity from and to the above named points, published in Supplement 178 to L. & N. R. R., G. F. O. 47-C, I. C. C. A-15707. Rate of 3½c per 100 lb., as per L. & N.R.R., G. F. O. 47-C, I. C. C. A-15707 to apply after cancellation.

SOUTHWESTERN FREIGHT BUREAU DOCKET

22647. **Silica sand**, from Everton and Rogers, Ark., to points in Oklahoma. To establish the following rates in cents per 100 lb. on silica sand, carloads (See Note 3), from and to points shown below:

To	From Everton, Ark. Dist.	Route	Rate
Ada, Okla.	342.3	1	12
Blackwell, Okla.	369.5	2	12
Bristow, Okla.	270.7	3	10½
Henryetta, Okla.	267.5	4	10½
Muskogee, Okla.	223.6	1	10
Okmulgee, Okla.	262.7	1	10½
Quinton, Okla.	244.9	5	10
Sand Springs, Okla.	242.6	6	10
Sapulpa, Okla.	248.9	3	10
Tulsa, Okla.	235.2	3	10

To	From Rogers, Ark. Dist.	Route	Rate
Ada, Okla.	242.4	7	8½
Blackwell, Okla.	309.4	8	11
Bristow, Okla.	214.6	7	8
Henryetta, Okla.	167.6	9	8
Muskogee, Okla.	123.7	7	6½
Okmulgee, Okla.	162.8	7	7
Quinton, Okla.	145	10	7
Sand Springs, Okla.	199.7	11	8½
Sapulpa, Okla.	192.8	7	8
Tulsa, Okla.	192.3	7	8

Routes Via Which Mileages Are Figured

1. Via M. & N. A. Ry., Seligman, Mo., St. L. S. F. Ry.
2. Via M. & N. A. Ry., Neosho, Mo., St. L. S. F. Ry., Perry Okla., A. T. & S. F.
3. Via M. & N. A. Ry., Neosho, Mo., St. L. S. F. Ry.
4. Via M. & N. A. Ry., Seligman, Mo., St. L. S. F. Ry., Muskogee, Okla., K. O & G. Ry.
5. Via M. & N. A. Ry., Seligman, Mo., St. L. S. F. Ry., Ft. Smith, Ark., Ft. S. & W. Ry.
6. Via M. & N. A. Ry., Neosho, Mo., St. L. S. F. Ry., Tulsa, Okla., S. S. Ry.
7. Via St. L.-S. F. Ry. direct.
8. Via St. L.-S. F. Ry., Perry, Okla., A. T. & S. F.
9. Via St. L.-S. F. Ry., Muskogee, Okla., K. O. & G.
10. Via St. L.-S. F. Ry., Ft. Smith, Ark., Ft. S. & W. Ry.
11. Via St. L.-S. F. Ry., Tulsa, Okla., S. S. Ry.

It is stated that operators are prepared to open up and develop a deposit of silica sand at Everton, Ark., but as a prerequisite they must have rates which will allow them to ship the sand on a relative basis with competitors such as Guion, Ark. The rates from Guion, Ark., to this territory are based on the 9702 scale, and the same basis from Everton has been suggested. Silica sand is also produced at Rogers, Ark., and rates are proposed from Rogers based on the same scale. It is understood that these rates are only temporary pending decision of the commission in I. C. C. Docket 17000, part 11A.

22664. **Sand**, from Everton and Rogers, Ark., to Rio Grande crossing destined Mexico. To establish a rate of 23c per 100 lb. on sand (except asbestos sand), carloads (See Note 2), from Everton and Rogers, Ark., to Brownsville, Eagle Pass, El Paso and Laredo, Tex., when destined to points in Mexico, except on traffic to points north of Jimenez, Chihuahua, on National Railways of Mexico. Operators advise of their intention of developing a deposit of common and silica sand at Everton, Ark., and request establishment of through commodity rates which will enable them to ship this sand in competition with producers at Guion, Ark. Operations have already begun at Rogers, Ark., and it is also desired to publish rates from this point on a competitive basis. The rate from Guion, Ark., is published in Item 8980, S. W. L. Tariff 112E, and this proposal merely contemplates the addition of Everton and Rogers, Ark., as origin points in this item.

CENTRAL FREIGHT ASSOCIATION DOCKET

28117. To establish on **fluxing stone**, carloads (See Note 3), from Keeport, Ind., to Lansing, Mich., rate of 140c per net ton. Routing—Wabash Ry., Fort Wayne, Ind., N. Y. C. R. R. Present rate, 202c per net ton.

28118. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **and gravel**, carloads (See Note 3), from Wolcottville, Ind., to Tremont, Ind., rate of 95c per net ton. Routing—Wabash Ry., Tolleston, Ind., C. S. S. & S. B. R. R. Present rate, classification basis.

28119. To establish on **crushed stone**, carloads (See Note 3), from North Baltimore, O., to Canton, O., rate of 90c per net ton. Present rate, 100c per net ton.

28129. To establish on **sand and gravel**, carloads (See Note 3), from Buffalo and Black Rock, N. Y., to Westfield, N. Y., rate of 90c per ton of 2000 lb. Present rate, 83c.

28130. To establish on **crushed stone**, carloads (See Note 3), from Sandusky, O.

To	Prop.	Pres.
Medina, O.	*75	80
Spencer, O.	†70	80

*Route via B. & O. R. R. direct.

†Route via B. & O. R. R., Monroeville, O., and W. & L. E. Ry.

*128131 (*Cancels W. D. A. 27874). To establish on **crushed stone** (in bulk); **crushed stone screenings** (in bulk), and **limestone, unburned, agricultural** (in bulk, in open-top cars only), car-

loads (See Note 3), from Sandusky, O., to stations in Michigan (representative points shown in Exhibit A), rates as shown in Exhibit A attached. Present rates—Sixth class basis, except at Jackson, Mich., where rate of $1.61 per ton is in effect.

To representative stations in Michigan

EXHIBIT "A"

N. Y. C. R.R.	Prop.	Gr. Tr. Ry.	Prop.
Ottawa Lake	90	Capac	135
Grand Rapids	175	Lowell	165
Dundee	105	Bad Axe	165
Clinton	100	Mich. Cent. R.R.	
Ann Arbor R.R.		La Salle	97
Dundee	87	Kalamazoo	165
Chilson	115	Colon	155
Mt. Pleasant	155	Grand Rapids	175
Cin. Nor. R.R.		Mason	145
Prattville	117	Pere Marq. R.R.	
Cement City	125	Willow	102
Jackson	135	Salem	115
C.C.C. & St.L. Ry.		Glen Lord	195
Niles	145	Holton	185
Benton Harbor	155	Detroit	125
Gr. Tr. Ry.		Penn. R.R.	
Middletown	155	Mendon	135
Armada	135	Wayland	155
Vicksburg	145	Muskegon	185

28132. To establish on **sand and gravel,** carloads (See Note 3), from Riverton, Ind., and Palestine, Ill., to Robinson, Ill., rate of 50 cents per ton of 2000 lb. Present rate, 65c per ton of 2000 lb.

28136. To establish on **crushed stone,** carloads (See Note 3), from Sandusky, O., to Pontiac, Havana, Centerton, Willard and New Haven, O., rate of 50c per ton. Present rate, 60c per ton. Route—Via B. & O. R. R. direct.

28140. To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **or gravel,** carloads (See Note 3), from Jamestown, N. Y. (rates in cents per ton of 2000 lb.):

To	Pres.	Prop.
Union City, Penn.	*125	80
Concord, Penn.	*125	80
Corry, Penn.	*125	70
Columbus, Penn.	*125	70
Bear Lake, Penn.	*125	70
Niobe, N. Y.	75	70
Watts Flats, N. Y.	75	70
Ashville, N. Y.	75	60
Lakewood, N. Y.	75	60
Falconer, N. Y.	70	60
Kennedy, N. Y.	70	60
Red House, N. Y.	83	70
Salamanca, N. Y.	83	80
Carrollton, N. Y.	†250	80
Limestone, N. Y.	†250	80
Conewango, N. Y.	75	70
Cherry Creek, N. Y.	83	70
South Dayton, N. Y.	83	70
Markhams, N. Y.	83	70
Dayton, N. Y.	83	80
Gowanda, N. Y.	83	80
Collins, N. Y.	‡110	80
West Salamanca, N. Y.	83	80
Little Valley, N. Y.	83	80
Cattaraugus, N. Y.	83	80
Persia, N. Y.	83	80
Smiths Mills, N. Y.	91	80
Forestville, N. Y.	91	80
Sheridan, N. Y.	91	80

*Rate from Buffalo, N. Y.
†Sixth class rate.
‡Rate from Saegertown, Penn.

28146. To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, **loam, molding or silica) or gravel, crushed stone and furnace slag** (a product of iron and steel blast or open hearth furnaces), carloads (See Note 3), from Buffalo, N. Y.

	Present			
To	(1)	(2)	(3)	Prop.
Union City, Penn.	125	125	125	110
Concord, Penn.	125	125	125	110
Corry, Penn.	125	125	125	100
Columbus, Penn.	125	125	125	100
Lottsville, Penn.	125	.....	125	100
Bear Lake, Penn.	125	125	125	100
Niobe, N. Y.	110	110	110	100
Watts Flats, N. Y.	110	110	110	100
Ashville, N. Y.	110	110	110	90
Lakewood, N. Y.	100	100	100	90
Jamestown, N. Y.	100	100	100	90
Falconer, N. Y.	100	100	100	90
Kennedy, N. Y.	91	91	91	90
Randolph, N. Y.	100	100	100	90
Steamburg, N. Y.	100	100	100	90
Red House, N. Y.	100	100	100	90
Conewango, N. Y.	91	91	91	80
Cherry Creek, N. Y.	91	91	91	80
Peek's Siding, N. Y.	....	....	....	80
South Dayton, N. Y.	91	91	91	80
Markhams, N. Y.	83	83	83	70
Dayton, N. Y.	83	83	83	70
Gowanda, N. Y.	83	83	83	70
Collins, N. Y.	83	83	83	70
Lawtons, N. Y.	83	83	83	70
North Collins, N. Y.	....	75	75	70

(Rates in cents per ton of 2000 lb.)
(1) Slag; (2) Crushed stone; (3) Sand and gravel.

28139. To establish on **rip rap and rubble stone,** carloads (See Note 3), from Greenfield and Thrifton, O., rate of 101c per net ton (mileage scale rate for distance of 75 miles and over 60 miles) to Cincinnati, O. Route—Via B. & O. R. R. direct. Present rate, 126c per net ton.

28151. To cancel rate of 76c per ton of 2000 lb. on **limestone,** carloads (See Note 3), from Sharon, Penn., to Lowellville, O., as named in N. Y. C. R. R. I. C. C. LS-1247, Tariff 1427, Item 30, account present rate being obsolete, classification basis to apply in lieu thereof.

28153. To amend carload minimum weight applicable in connection with rates on **sand,** carloads, from producing points in Canada to destination points located in C. F. A. territory, by providing for the following minimum weights to apply in connection therewith: "Minimum weight 90% of capacity of car, but in no case less than 60,000 lb. When cars are loaded to their full cubical capacity and will not contain the above minimum, the actual weight will be applied, but in no case less than 60,000 lb." Present minimum weight 90% of capacity of car, but in no case less than 60,000 lb.

28154. To establish on **crushed stone** (in bulk) **and limestone, unburned, agricultural** (in bulk, in open-top cars), (See Note 3), from Luckey, O., to Clyde, O., present 240c; *proposed 85c; Alliance, O., present 370c, *proposed 135c per net ton. *N. Y. C. R. R. delivery.

28157. To establish on **sand and gravel,** in open-top cars, carloads (See Note 3), from Circleville, O., to Lancaster, O., proposed 60c, present 65c; Washington C. H., O., proposed 65c, present 70c per ton of 2000 lb.

28160. To establish on **stone, lake or river filling,** carloads, in open-top equipment (See Note 3), from Neshannock Falls, Penn., to Erie, Penn., rate of 113c per net ton of 2000 lb. Present rate, 139c per ton of 2000 lb.

28164. To establish on **sand and gravel,** carloads (See Note 3), from Leeland, Ind., to St. Joe, Ind., rate of 70c per net ton. Present rate, 75c per net ton.

28169. To establish on **stone, viz., rubble, rip rap and quarry scrap,** carloads (See Note 3), from McDermott, O., to Lorain, O., rate of 145c per ton of 2000 lb. Present rate, 260c per ton of 2000 lb.

28172. To establish on **sand and gravel,** carloads (See Note 3), from Chillicothe, O. Rates in cents per net ton except as noted:

To	Prop.	Pres.
Silver Run, W. Va.	120	*
Central, W. Va.	130	*
Wilsonburg, W. Va.	140	*
Webster, W. Va.	150	*
Grafton, W. Va.	160	*

*Sixth class, in cents per 100 lb.

28176. To establish on **crushed stone,** carloads (See Note 3) from Lewisburg, O., to Cecil, O., rate of 70c per net ton, rate to expire November 30, 1931. Present rate, 80c per net ton.

28177. To establish on **crushed stone, coated with oil, tar or asphaltum,** carloads (See Note 3), from Pittsburgh, Penn.

To	Prop.	To	Prop.
Finleyville, Penn.	107	Morgantown, W.Va.	142
West Newton, Penn.	107	Clarion Jct., Penn.	170
Merritstown, Penn.	130	Meadville, Penn.	153
New Salem, Penn.	130	Berlin, Penn.	170
Leckrone, Penn.	130	Somerset, Penn.	170
Masontown, Penn.	142	Fairmont, W. Va.	153
Point Marion, Penn.	155		

Present rates, sixth class, no commodity rates in effect.

28190. To establish on **limestone dust,** carloads, minimum weight 40,000 lb., from Port Clinton, O. (Rates in cents per net ton):

To	Prop.	Pres.
Akron, O.	140	*
Youngstown, O.	150	*
Pittsburgh, Penn.	230	*
Detroit, Mich.	176	*

*Sixth class basis.

28208. To establish on **sand and gravel,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads (See Note 3), from Burr Oak, Ind., to (proposed rates, M. C. R. R. stations via Michigan City, Ind.), Furnessville, Ind., 95c; Willow Creek, Ind., 100c; East Gary, Ind., 100c per net ton. Present rates, sixth class.

28211. To establish on **concrete aggregates,** defined as such, **crushed stone, sand and gravel** as are materials in concrete mixtures, in straight or mixed carloads (See Note 3), from Oxford and New Hudson, Mich., rate of 60c per net ton. Present rate, 75c per net ton.

28217. To establish on **agricultural limestone,** in **bags,** in box cars, carloads, minimum weight 80,000 lb., except when cars are loaded to full visible capacity actual weight will apply, but not less than 60,000 lb., from Milwaukee, Wis., to Gaylord, Mich., rate of 222c and West Branch, Mich., 212c per net ton. Present: No commodity rates in effect at present, classification basis applies.

ILLINOIS FREIGHT ASSOCIATION DOCKET

5926-A. **Sand and gravel,** usual minimum weight, from Browntown, Wis., to Bloomington, Galesburg, Kewaunee, Springfield, Decatur, Peoria and Beardstown, Ill. Present rate, combination of locals; proposed, 30c per net ton less than the present combination.

6143. **Sand and gravel,** carloads (See Note 2), but not less than 40,000 lb., from Metropolis and Cairo, Ill., to Texico. Rates in cents per net ton.

	Pres.	Prop.
Cairo, Ill.	105	100
Metropolis, Ill.	126	.....

6124. **Sand and gravel,** carloads (See Note 1), from Riverton, Ind., and Palestine, Ill., to Robinson, Ill. Present rate, 65c; proposed, 50c.

6128. **Sand and gravel,** carloads (See Note 1), from Grayville, Ill., to Olney, Ill. Present rate, 76c; proposed, 65c per ton of 2000 lb.

6132. **Rough limestone,** carloads (See Note 2), from Thebes, Ill., to Cox, Ill. Present rate, 63c; proposed, *50 per ton of 2000 lb.

*Applicable only on Illinois state traffic and then only on stone to be crushed, ground and/or pulverized and then reshipped via the C. & E. I. Railway.

6138. **Sand** (except blast, core, engine, filter, fire or furnace, etc.) **and gravel,** carloads (See Note 3), from East St. Louis, Ill., to Collinsville, Ill. Present rate, 70c; proposed, 55c per net ton.

TRUNK LINE ASSOCIATION DOCKET

26456. **Gravel and sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads (See Note 2), from Carpenterville, N. J., to Hometown, Penn., $1.25 per net ton. (Present rate, 17½c per 100 lb., sixth class.) Reason—Proposed rate is fairly comparable with rate to Andreas and Snyders, Penn.

26472. **Limestone, viz., crude, fluxing, foundry and furnace,** when shipped in open-top equipment, carloads (See Note 2), from Strasburg Jct., Va.

To	Prop.	To	Prop.
Aliquippa, Penn.	169	Portsmouth, O.	319
*Baltimore, Md.	130	Sharon, Penn.	193
†Baltimore, Md.	189	Sparrows P'nt, Md.	130
Follansbee, W. Va.	169	Steubensville, O.	169
Lowellville, O.	193	Toronto, O.	169
Midland, Penn.	169	Warren, O.	193
Monessen, Penn.	143	Weirton, W. Va.	169
Pittsburgh, Penn.	143	Youngstown, O.	193

*B. & O. R. R. delivery. †P. R. R. delivery.
Rates in cents per gross ton.
Reason—Proposed rates are fairly comparable with rates from Stephens City, Va.

26476. **Stone, crushed or quarry broken,** carloads (See Note 2), from Jamesville, N. Y., to Skaneateles Jct., N. Y., on traffic destined to points on the Skaneateles R. R., 68c per net ton. Present rate, 91c per net ton. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

26491. **Crushed stone, coated with oil, tar or asphaltum,** carloads (See Note 2), from Le Roy and Stafford, N. Y., to Irvine Mills and Limestone, N. Y., $1.10 per net ton. (Present rate, $1.50 per net ton.) Reason—Proposed rate is comparable with rates on like commodities from and to points in the same general territory.

26492. To establish on **refuse roasted dolomite,** loaded in open-top equipment, carloads, minimum weight 60,000 lb., from Kenova, W. Va., to points on the B. & O. R. R. in Ohio and West Virginia, as published in B. & O. I. C. C. 21184, same rates as carried therein on agricultural limestone when loaded in open-top equipment.

26494. **Crushed stone,** carloads (See Note 2), from Bethlehem (Chapman's Switch), Penn., to Port Richmond, Philadelphia, Penn., $1.10 per net ton. (Present rate, $1.25 per net ton.) Reason—To meet motor truck competition.

26527. **Stone, natural** (other than bituminous asphalt rock), **crushed, coated with oil, tar or asphaltum,** carloads (See Note 2), from (A) South Bethlehem, N. Y., and (B) South Amsterdam, N. Y. Proposed rates per net ton:

To (Long Island R. R.)	(A)	(B)
Group A	$2.50	$2.60
Group B	3.00	3.10
Group C	3.20	3.30
Group D	3.80	3.90

Reason—Proposed rates are comparable with rates on like commodities now in effect within the same general territory.

26528. (A) **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads; (B) **sand, blast, engine, foundry, molding, glass, silica, quartz or silex,** carloads (See Note 2), from Lewes, Del. Proposed rates in cents per 2000 lb.:

To (Long Island R. R.)	(A)	(B)
Group A	330	350
Group B	380	400
Group C	400	420
Group D	460	480

Reason—Proposed rates are fairly comparable with rates from Cape May, N. J.

26226, Sup. 1. **Sand, building, engine, blast, glass, molding, and ground flint,** carloads (See Note 2), from Hancock and Round Top, Md., to Barre, Vt., $4.30 per net ton.

26312, Sup. 1. (A) **Sand,** in open-top cars, carloads; (B) **sand,** in box cars or closed equipment, carloads (See Note 2), from Quail Run and Pine-

wald, N. J. Proposed rates in cents per 2000 lb.:

To	(A)	(B)
Wilmington, Del.	160	180
Downingtown, Penn.	160	180
Kennett Square, Penn.	200	225
Frederick, Md.	245	265
Plymouth Meeting, Penn.	165	185
Blue Bell, Penn.	165	185

26530. **Stone, natural** (other than bituminous asphalt rock), **crushed,** carloads (See Note 2), from East Buffalo, Black Rock, Harriet and Buffalo stations, N. Y., to North Tonawanda, N. Y., 60c per net ton. (Present rate, 75c per net ton.) Reason—To meet motor truck competition.

26531. **Asbestos sand and asbestos gravel,** carloads, in bags or in bulk, minimum weight 60,000 lb., from Danville, Warwick and Sherbrooke, Que. (ex Q. C. Ry.), to New York, N. Y., lighterage delivery, 26½c per 100 lb. Reason—Proposed rate is comparable with rates on asbestos refuse and shorts.

26534. **Limestone, crude, fluxing, foundry and furnace,** when shipped in open-top equipment, carloads (See Note 2). Rates in cents per 2240 lb. to B. & O. R. R. stations, Index Nos. Curlett's I. C. C. A265.

From A—Ashton, Md., Big Springs, Md., Cavetown, Md., Charlton, Md., Hancock, Md., Kemps, Md., Nessle, W. Va., Pinesburg, Md., Williamsport, Md.

From B—Bittinger, Penn., Hanover, Penn., Thomasville, Penn.

	—Proposed— (A)	(B)
2495—McKeesport, Penn.	126	136
2500—Demmler, Penn.	126	136
2510—Bessemer, Penn.	126	136
2520—Rankin, Penn.	126	136
2530—West Homestead, Penn.	126	136
2670—Junction Transfer, Penn. to 2725—Etna, Penn.	126	136

Reason—Proposed rates are same as at present published to other points in Pittsburgh, Penn., district.

26536. **Crushed stone and screenings,** carloads (See Note 2), from Curwensville, Penn., to P. R. R. stations, Grampian, Philipsburg, Tyrone, Houtzdale, Raney Col. No. 2, Black Oak Co. No. 4, Smoke Run, Cammos, McCartney, Morrisdale, Jefferson Col., Meadowbrook Col., Belfast Col., and various. Rates ranging from 60c to $1 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

26538. **Limestone, agricultural, ground, precipitated, pulverized and limestone dust,** carloads, minimum weight 50,000 lb., from Ogdensburg and Lime Crest, N. J., to Erie R. R. stations, Water Valley, N. Y., to Oil City, Penn., inclusive, 15c per 100 lb. Reason—Proposed rate is comparable with rates to Salamanca, Buffalo, N. Y., etc.

26539. **Stone, natural** (other than bituminous asphalt rock), **crushed,** carloads (See Note 2), from South Amsterdam, N. Y., to Fort Hunter, Auriesville, Fultonville and Randall, N. Y., 65c per net ton. (Present rate, 75c per net ton.) Reason—To meet barge canal competition.

26540. **Stone, crushed,** carloads (See Note 2), from Casparis, Penn., to Glenwood, Penn., when for transshipment by or on barges and/or boats, 80c per net ton f.o.b. cars Glenwood; when for transshipment by or on barges and/or boats, an additional charge of 10c per ton, minimum 800 tons per barge or boat to be published to cover use of B. & O. R. R. dumping facilities.

26543. **Limestone, ground or pulverized,** carloads, minimum weight 50,000 lb., from Munns, N. Y., to stations on the D. L. & W. R. R., Clarks Summit, New Milford, Hallstead, Penn., Conklin, Binghamton, Johnson City, Owego, Wilseyville, Elmira, Chenango Bridge, Oxford, Hubbardsville, Unadilla Forks, Richfield Springs, Washington Mills, N. Y., and various, rates ranging from 81c to $1.80 per net ton. Reason—Proposed rates are fairly comparable with rates from Jamesville, N. Y.

26553. **Limestone screenings,** carloads (See Note 2), from Templeton, Penn., to Neville Island, Penn., 90c per net ton. Present rate, $1.10 per net ton. Reason—Proposed rate is comparable with rates on like commodities from and to points in the same general territory.

26554. (a) **Crushed stone and (b) crushed stone, coated with tar, oil or asphaltum,** carloads (See Note 2), from White Haven, Penn., to Deposit, N. Y.: (a) $1.60 and (b) $1.70 per net ton. Reason—Proposed rates is comparable with rates on like commodities for like distances, services and conditions.

26565. **Sand** (other than blast, engine, foundry, glass, molding or silica) **and gravel,** carloads (See Note 2), from Phillipsburg, N. J., to Perth Amboy, N. J., 90c per net ton. Present rate, $2.60 per net ton, sixth class. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

26573. **Sand,** other than blast, foundry, engine, fire, glass, molding, quartz, silex and silica, carloads (See Note 2), from Palmerton, Penn., to Jeanesville, Beaverbrook, Almonry, Harleigh Colliery, Oakbur Jct., and Lattimer Mines, Penn., $1 per net ton. Reason—Proposed rates are comparable with rates to Jeddo, Milnesville, Penn., etc.

26576. **Limestone, crushed or ground,** carloads, minimum weight 60,000 lb., from Rocky Point, Va., to Washington, D. C., $1.65, and Baltimore, Md., $1.80 per net ton. Reason—Proposed rates are fairly comparable with rates from Barber, Va.

26595. **Crushed stone,** carloads (See Note 2), from Rock Hill, Penn., to Hammonton, N. J., $1.15, and Pleasantville and Atlantic City, N. J., $1.40 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

26597. **Trap rock, mine rock, broken stone, crushed stone and stone screenings,** carloads (See Note 2), from Bernardsville, N. J., to New Providence and Murray Hill, N. J., Berkeley Heights to Stirling, N. J., inclusive, Millington to Basking Ridge, N. J., inclusive, and Mine Brook to Gladstone, N. J., inclusive, 45c per net ton. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

26608. **Crushed stone, and crushed stone coated with oil, tar or asphaltum,** carloads (See Note 2), from Schonarie, N. Y., to N. Y. C. R. R. and W. S. R. R. stations, Stockport, Poughkeepsie, Martindale, Croton Falls, Chappaqua, Elmsford, Fullers, Coxsackie, Gardner, Kingston, Cornwall, Haverstraw, N. Y., and various, rates on crushed stone ranging from 95c to $2 per net ton, and on coated stone ranging from $1.05 to $2.10 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

26609. **Gravel and sand** (other than blast, core, engine, fire, foundry, glass, molding, quartz, silex or silica), in straight or mixed carloads, in open-top equipment (See Note 2), from Seward, Penn., to Altoona, Mahaffey, Fordham, Wildwood Springs, Coalport, Bellnap, Glen Campbell, Spangler, Cherry Tree, Heilwood, Clymer, Dixonville, Vintondale, Josephine, Penn., and various, rates ranging from 70c to $1 per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

26611. **Stone, natural** (other than bituminous asphalt rock), **crushed, coated with oil, tar or asphaltum,** carloads (See Note 2), from South Amsterdam, N. Y., to destinations on the B. & M. R. R., Hoosick, N. Y., Pownal, Vt., Williamstown, South River, Northampton, Chicopee, Ware, West Rutland, Millers Falls, Royalston, Heywood, Worcester, Turners Falls, Fitchburg, Concord, West Chelmsford, Belmont North, Bedford, Lexington, Haverhill, Amesbury, Chelsea, Medford, Boston, Mass., and various, rates ranging from $1.35 to $2 per net ton. Reason—Proposed rates are comparable with rates now in effect from South Bethlehem, N. Y., to same points of destination.

M-1772. To establish on **stone, crushed, coated with oil, tar or asphaltum,** carloads (See Note 2), from Baltimore (Leonard Siding), Md., to N. & W. Ry. points, Lynchburg, Montvale, Rostoco, Lithia, Elkton, Gaylord, Va., Rippon, W. Va., St. James, Md., Salem, Merrimac, Eggleston, Va., and various, rates ranging from $1.60 to $3 per net ton. Reason—Proposed rates are based on I. C. C. Docket 1885 scale for actual distance and are comparable with rates from other producing points to this particular territory.

26612. **Building sand,** in open-top equipment, carloads (See Note 2), from Berkeley Springs, Great Cacapon and Hancock, W. Va., to Frederick, Md., $1, and Brunswick, Md., 90c per net ton. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

26613. **Sand and gravel,** carloads (See Note 2), from Alpha, N. J., to Kenilworth, N. J., 85c per net ton. Present rate, sixth class. Reason—Proposed rate is comparable with rates on like commodities from and to points in the same general territory.

26614. **Building sand,** in open-top equipment, carloads (See Note 2), from Berkeley Springs, Great Cacapon and Hancock, W. Va., to Galt, Md., $1.45 per net ton. Present rate, $1.85 per net ton. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

26623. **Sand, common or building** (not blast, engine, fire, foundry, glass, molding or silica), Lacona and Cape Vincent, N. Y., to Watertown, carloads, **and gravel,** carloads (See Note 2), from N. Y., 70c per net ton. Reason—To meet motor truck competition.

26627. **Stone, natural** (other than bituminous asphalt rock), **crushed,** carloads, and **stone, natural** (other than bituminous asphalt rock), **crushed, coated with oil, tar or asphaltum,** carloads (See Note 2), from Feura Bush, N. Y., to Kingston, N. Y., $1 per net ton. Present rate, $1.10 per net ton. Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

26632. **Limestone, ground or crushed,** carloads, minimum weight 50,000 lb., from Munns, N. Y., to Vienna, McConnellsville and Camden, N. Y., $1.10 per net ton. Present rate, $1.40 per net ton. Reason—Proposed rate compares favorably with rates from Watertown and Blakeslee, N. Y., to Camden, N. Y.

26636. **Ground limestone, carloads,** minimum weight 60,000 lb., from Bellefonte, Pleasant Gap and Chemical, Penn., to points in Pennsylvania.

To	Prop.	To	Prop.
Coal Jct.	180	Meyersdale	170
Bell	195	Black	170
Gray	195	Garrett	170
Deal	170	Swanson	170
Warrens Mill	170	Rockwood Jct.	170
Sand Patch	170	Rockwood	170
Keystone	170	Casselman	180

Proposed rates in cents per 2000 lb.

Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

M-1719. **Crushed stone,** carloads (See Note 2), from Jamesville, N. Y., to Weedsport, N. Y., 75c per net ton, rate to expire December 31, 1931. Present rate, 91c per net ton. Reason—To meet motor truck competition.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

22376. **Stone, broken or crushed** (See Note 3), from Lenoxdale, Mass., to Ashley Falls, Mass. Present rate, 90c; proposed, 65c per net ton. Reason—To meet motor truck competition.

22377. **Stone, broken or crushed,** in bulk, gondola or other open-top cars (See Note 3), from Branford (Pine Orchard Quarry), Conn. (rates in cents per net ton):

To	Prop.	Pres.
New Milford, Conn.	95	105
Washington, Conn.	95	110

Reason—To meet motor truck competition.

22378. **Stone, broken or crushed,** in bulk in gondola or other open-top equipment (See Note 3), from Branford (Pine Orchard Quarry), Conn., and Westfield, Mass., to East Providence Wharf, R. I. Present rates: Branford (Pine Orchard Quarry), Conn., $1.30; Westfield, $1.40 per net ton. Proposed, Branford, $1; Westfield, $1.10. Reason—Rate from Branford necessary to meet barge competition and from Westfield necessary to maintain the going relationship.

22429. **Sand, common or run of bank** (See Note 2), from New Haven, Conn., to Mt. Kisco, N. Y. Present rate, 18½c; proposed, $1.50 per net ton. Reason—To provide a rate on a relative basis with that now in effect from Avon to Amenia.

22430. **Crushed stone (trap rock),** (See Note 2), except when cars are loaded to cubical or visible capacity actual weight will apply, from Westfield, Mass., to North Grafton and Westboro, Mass. Present rate, $1.10; proposed, 90c per net ton. Reason—To establish rates comparable with existing rates for like distances.

22431. **Sand and gravel** (See Note 2), except when the combined weight of car and loading exceeds the published maximum weight limits, in which case the minimum weight will be the maximum weight that can be transported via the direct route to destination point without exceeding the maximum weight limit, from New Haven, Conn., to White Plains, N. Y. Present rate, 9½c; proposed, 85c per net ton. Reason—Proposed rate is necessary to meet barge-motor truck competition.

WESTERN TRUNK LINE DOCKET

6729-D. **Sand and gravel** (See Note 3), but in no case shall the minimum weight be less than 40,000 lb., from Chippewa Falls and Eau Claire, Wis., to Viroqua, Wis., Charles City, Ia., and Missouri River points.

From Chippewa Falls, Wis.

To	Pres.	Prop.
Viroqua, Wis.	11½	6½
Charles City, Ia.	16	10
Council Bluffs, Ia.	22	14½
Omaha, Neb.	22	14½
South Omaha, Neb.	22	14½
Kansas City, Kan.	31	16
Kansas City, Mo.	23	16
North Kansas City, Mo.	31	16
St. Joseph, Mo.	23	16

From Eau Claire, Wis.

To	Pres.	Prop.
Viroqua, Wis.	6½	6½
Charles City, Ia.	10	10
Council Bluffs, Ia.	20½	14½
Omaha, Neb.	20½	14½
South Omaha, Neb.	20½	14½
Kansas City, Kan.	31	16
Kansas City, Mo.	23	16
North Kansas City, Mo.	31	16
St. Joseph, Mo.	23	16

1062-M. **Sand and gravel, carloads** (See Note 1), from Ottumwa, Ia., to stations within a radius of 200 miles of Ottumwa, Ia., single line. Present rates, various; proposed, I. C. C. Docket 21755 scale, single line.

3089-L. **Limestone, ground,** carloads (See Note 2), but not less than 40,000 lb., from Hannibal, Mo., to Sioux City, Ia. Present rate, 16c; proposed, 11½c per 100 lb.

3527-R. **Marble, crushed, ground and/or pulver-**

ired, carloads, minimum weight (present) 40,000 lb., (proposed) 40,000 lb., from Memphis, Cairo and points shown in Item 674 of Agent Speiden's Tariff 66E, when originating at points in the Southeast or Carolina territories, to Missouri River points and taking same rates. Present rate, Class E, 370c per ton; proposed, to establish on crushed, ground and/or pulverized marble the same rates as now applicable on ground limestone as shown in Item 674.

5319-D. **Sand, gravel, stone, crushed,** and articles taking same rates (See Note 2), subject to other provisions as at present, from and to points in Nebraska on intrastate traffic. Rates in cents per net ton.

Miles	One-line scale Pres.	Prop.	Two-line scale Pres.	Prop.
25	70	40	90	60
40	70	45	90	65
50	70	50	90	70
60	80	55	100	75
70	90	60	110	80
80	100	70	120	90
90	110	80	130	100
100	120	90	140	110

No reductions proposed for distances over 100 miles.

Rates to carry an expiration date of December 31, 1931.

No switching charges to be absorbed at point of origin.

7576. **Sand, asbestos, sand,** N. O. I. B. N., strippings, sand pit (See Note 1), except when car is loaded to full visible capacity actual weight will govern, but not less than 60,000 lb., from Everton and Rogers, Ark., to Denver, Colo., and Groups B, C and D, per W. T. L. Tariff 111G. Present rates, class; proposed, 34½c per 100 lb.

4264-E. **Sand and gravel,** carloads (See Note 3), but in no case shall the minimum carload weight be less than 40,000 lb., from Rock Rapids, Ia. Rates in cents per net ton.

To	Pres.	Prop.
Ellis, S. D.	140	80
Hartford, S. D.	140	80
Humboldt, S. D.	140	90

6025-C. **Limestone, crushed or ground,** carloads; minimum weight, present, various; proposed (See Note 3), from Valmeyer, Ill., to representative points in Kansas as shown below. Present rates, class and combination; proposed, to Atchison, Leavenworth, Kan., and St. Joseph, Mo., 230c per ton of 2000 lb., also rates to representative points.

To	1st class	8½%
Lawrence	150	13
Topeka	162	14
Colby	225	19
Independence	174	15
Wichita	190	16
Dodge City	215	18

(Complete copy of exhibit will be furnished on request)

2202-A. **Stone, quarry scrap,** carloads (See Note 3), from Silverdale, Kan., to Lincoln, Neb. Present rate, 13½c; proposed, 12c per 100 lb.

I. C. C. Decisions

23281. Building Lime Routing. Washington Building Lime Co. vs. B. and O. et al., the Interstate Commerce Commission dealt with the question of rates on building lime from Engle, W. Va., to Charlottesville, Hampton, Portsmouth and Virginia Beach, Va., in view of the routing instructions given by the complainant. It found some of the rates inapplicable in some instances, unreasonable in some and that in some instances the shipments had been misrouted by the principal defendant. It awarded reparation.

Five shipments to Charlottesville and one to Hampton, routed with rates inserted in the bills of lading, were found to have been given the lowest available rates. The Commission said that the rates inserted in the bills by the complainant were not applicable over any route. It found that no damage resulted from any misrouting as to them.

On shipments to Charlottesville and Hampton the Commission found the rates were unreasonable to the extent they exceeded $2.90 and $3.50 a net ton, respectively.

A further finding was that rates of $3.37 and $3.40 a net ton on shipments to Portsmouth were inapplicable over the routes of movement; that the applicable rate over the route of movement was $5.30; that those shipments were misrouted by the B. and O.; that the applicable rate over the route over which the shipments should have moved was $3.40 plus $4 a car and that that was unreasonable to the extent it exceeded $3.50.

A final finding, other than that the complainant was entitled to reparation, was that the rate of $3.96 charged on shipments to Virginia Beach was inapplicable over the route of movement; that the applicable rate over the route of movement was $6.20; that the applicable rate over the route the shipments should have been hauled was $3.96 and that that rate was unreasonable to the extent it exceeded $3.90, all rates in net tons.

In a number of the shipments the Commission found that there was conflict between the routing instructions and the rates inserted in the bills of lading by the consignor. It said it was well established that the fact of a conflict between the rate and route inserted in a bill of lading by the shipper placed the agent of the initial carrier under the duty of obtaining full and definite instructions from the shipper, and that if that duty were not performed, the initial carrier was required to protect the rate in effect over the cheapest route affording it a line haul. In support of that the report cited St. Louis Cooperage Co. vs. B. and O., 161 I. C. C. 258.

Chairman Brainerd, in a separate expression, concurred in the findings of unreasonableness of rates to Charlottesville, Portsmouth, Hampton and Virginia Beach. But he said he did not concur in that any of the shipments were misrouted.

22204. Cement Plaster. Baker and Holmes Co. vs. Seaboard Air Line Ry. Co. et al. Upon further hearing Ewing, Fla., found not to be within the switching limits of Tampa, Fla.; applicable carload rate on cement plaster from Agatite, Tex., to Ewing over the route the shipment should have moved found to be $9.72; applicable reconsigning charges over the route shipment should have moved found unreasonable in part. Reparation awarded. Original report, 161 I. C. C. 441, modified accordingly.

17517. Chert, Sand and Gravel. Upon petition of defendants and respondents, original report and order, 122 I. C. C. 133, and report and order on further hearing, 140 I. C. C. 85, which approved certain mileage scales of interstate rates as reasonable for application on sand, gravel, slag, etc., in straight or mixed carloads, between points in the state of Georgia and points in other states in southern territory, is modified to the extent of not requiring the rates therein approved and prescribed to be maintained on ground openhearth basic slag, or basic phosphate slag. Petitioners point out that evidence in these proceedings, in so far as they apply to slag, had reference to that material used for railroad ballast, and in concrete and highway construction competing with low-grade commodities such as crushed stone and gravel, all of which move in open-top equipment. Ground open-hearth slag is used as soil-builder and shipped in 100-lb. paper sacks in equipment to protect it from rain, snow, etc., its transportation characteristics being quite different from slag for ballast and construction purposes. This commodity is comprehended under the term "basic phosphate," which is included in list of fertilizer materials in Fertilizers between Southern Points, 113 I. C. C. 389.

22598. Coated Crushed Stone or Slag. Interstate Amiesite Co. vs. A. C. & Y. et al. Effective on or before July 13, the commission has prescribed reasonable interstate rates on crushed stone or slag, coated with oil asphaltum, or tar, from Shaw Junction, Pa., and Youngstown, Pa., to points in New York, Ohio, Pennsylvania and West Virginia, and has found unduly preferential and unduly prejudicial intrastate rates on the same commodities from Kenton, Marble Cliff, West Columbus and Youngstown, O., to certain destinations in Ohio, and has ordered removal of the preference and prejudice. The findings follow:

"We find that the rates assailed, from Youngstown and Shaw Junction to points in Pennsylvania and New York on and west of an imaginary line extending north and south through Cresson, Penn., and in Ohio and West Virginia, are, and for the future will be, unjust and unreasonable to the extent that they exceed the rates shown below:

RATES (IN CENTS)

Distance	Single-line	Joint-line
20 miles	73	88
40 miles	83	98
60 miles	93	108
80 miles	103	118
100 miles	113	128
125 miles	123	137
150 miles	133	146
175 miles	143	155
200 miles	153	164
225 miles	161	171
250 miles	168	177

"In computing distances for the application of the foregoing scale, the shortest routes over which carload traffic can be moved without transfer of lading should be used.

"We further find that the circumstances and conditions surrounding the intrastate transportation of coated stone from Kenton, Youngstown, Marble Cliff and West Columbus to points in Ohio on and east of an imaginary line drawn north and south through Marion are substantially similar to those surrounding the interstate transportation of like traffic from Shaw Junction to those points; that the rates set forth in the preceding table are and will be maximum reasonable rates from and to these points; and that the intrastate rates on coated stone from and to the aforesaid points, except for distances under 20 miles, are, and for the future will be, unduly preferential of the Ohio producers at Kenton, Youngstown, Marble Cliff and West Columbus and unduly prejudicial to complainant to the extent that they are, or may be, lower, distance considered, than the rates set forth in the preceding table contemporaneously in effect to the same points from Shaw Junction. The allegation of unjust discrimination against interstate commerce has not been sustained."

Plaster Board Rate Hearing

FINAL testimony on the application of the Gypsum Association for an adjustment of freight rates on plaster board and plaster wall board west of the Mississippi and in Indiana, Illinois, Wisconsin and upper Michigan was given April 15. Mr. Griffin, attorney examiner of the Interstate Commerce Commission, will make a recommendation on the proposed rate changes later, but it will probably be a year or more before the commission hands down a decision on the Gypsum Association's application.

The association protested that excessive transportation cost of plaster-board is resulting in harm to the industry. Particular protest was registered by the association against the present regulations of the railroads governing the transportation of gypsum products in mixed carloads. The railroads were accused of favoring Pacific coast manufacturers, who were said to profit by advantageous freight rates not available in the Middlewest and Southwest.—*Fort Dodge* (Ia.) *Messenger-Chronicle.*

Sand and Gravel Freight Rate Lowered

EFFECTIVE April 7, rates on sand and gravel from Janesville, Afton, Beloit, Racine, North Lake, Barton, Dousman, Ives, Salem, Silver Lake and Waukesha, Wis., to Milwaukee, Wis., were reduced 25%. According to an Associated Press dispatch, the Milwaukee and Northwestern roads may cancel the reduction after December 31 should they not profit.

According to G. F. Ehrlinger, secretary-treasurer of the Janesville Sand and Gravel Co., "The reduction is a move of the railroads to regain some of the business which has been lost to a large number of truckers in and around Milwaukee."—*Janesville* (Wis.) *Gazette.*

Portland Cement Output in March

THE PORTLAND CEMENT INDUSTRY in March, 1931, produced 8,227,000 bbl., shipped 7,172,000 bbl. from the mills and had in stock at the end of the month 29,627,000 bbl. Production of portland cement in March, 1931, showed a decrease of 26.7% and shipments a decrease of 18.7%, as compared with March, 1930. Portland cement stocks at the mills were 3.3% lower than a year ago.

The statistics here presented are compiled from reports for March, received by the Bureau of Mines from all manufacturing plants except four, for which estimates have been included in lieu of actual returns.

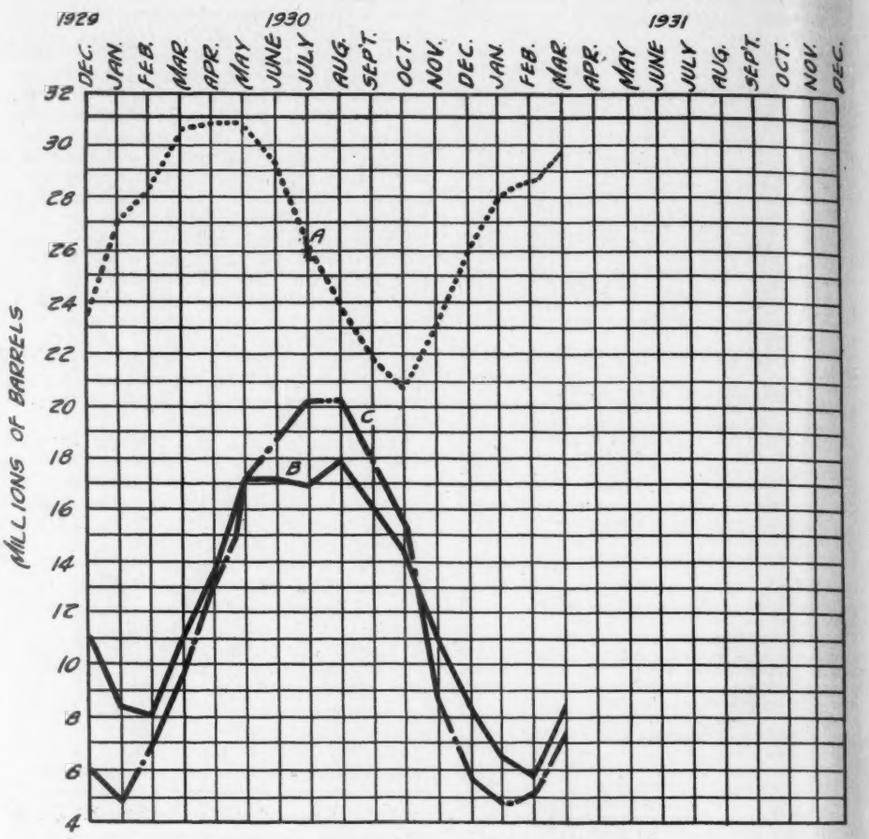
In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 165 plants both at the close of March, 1931, and of March, 1930. The estimates include increased capacity due to extensions and improvements during the period.

RELATION OF PRODUCTION TO CAPACITY

	Mar. 1930 Pct.	Mar. 1931 Pct.	Feb. 1931 Pct.	Jan. 1931 Pct.	Dec. 1930 Pct.
The month	51.5	36.9	29.4	29.5	38.2
12 months ended	66.1	58.6	59.7	60.6	61.5

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during January and February, 1930 and 1931:



(A) Stocks of finished portland cement at factories; (B) Production of finished portland cement; (C) Shipments of finished portland cement from factories

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN JANUARY AND FEBRUARY, 1930 AND 1931, IN BARRELS*

Shipped to	1930—January	1931	1930—February	1931
Alabama	106,309	88,798	135,425	103,610
Alaska	1,590	11	132	159
Arizona	49,286	36,015	35,218	36,834
Arkansas	43,629	54,904	80,512	43,685
California	560,052	580,888	†695,831	532,384
Colorado	14,818	20,937	43,570	32,603
Connecticut	63,245	40,081	60,197	40,716
Delaware	12,810	10,916	16,100	15,566
District of Columbia	44,747	53,960	48,482	56,388
Florida	91,344	64,038	82,931	60,601
Georgia	87,956	83,687	90,938	81,500
Hawaii	27,413	24,971	25,734	28,265
Idaho	2,585	4,465	9,943	7,472
Illinois	182,347	195,146	356,200	227,023
Indiana	94,596	79,310	189,599	108,914
Iowa	34,357	30,333	111,155	73,262
Kansas	45,558	70,951	191,412	111,835
Kentucky	32,854	56,581	74,974	73,215
Louisiana	175,009	133,695	285,398	156,356
Maine	14,125	8,263	14,370	9,015
Maryland	80,253	48,532	101,896	71,391
Massachusetts	104,522	106,524	89,617	69,184
Michigan	203,440	174,367	258,450	170,815
Minnesota	59,107	46,987	111,059	62,726
Mississippi	52,518	37,644	48,264	31,532
Missouri	76,507	167,209	244,403	182,133
Montana	6,175	9,502	12,497	10,912
Nebraska	22,811	16,464	71,051	49,142
Nevada	5,452	2,455	8,306	6,231
New Hampshire	9,598	6,586	9,612	7,359
New Jersey	257,563	135,679	252,624	151,941
New Mexico	10,758	12,200	16,490	14,839
New York	681,645	653,705	663,031	622,266
North Carolina	64,998	30,352	75,768	42,771
North Dakota	2,787	2,737	10,070	5,790
Ohio	243,570	188,631	403,404	219,903
Oklahoma	99,486	115,140	234,569	125,682
Oregon	25,776	†36,696	67,025	38,148
Pennsylvania	442,728	323,776	488,412	343,903
Porto Rico	1,750	620	1,750	1,020
Rhode Island	22,295	13,249	18,256	11,454
South Carolina	44,806	170,545	49,865	208,443
South Dakota	11,204	6,533	31,133	21,300
Tennessee	85,912	65,246	110,578	56,391
Texas	299,248	327,904	508,921	309,196
Utah	12,529	6,075	21,954	13,991
Vermont	21,257	2,869	14,964	2,014
Virginia	71,683	61,804	97,003	81,003
Washington	47,785	110,948	124,926	129,223
West Virginia	48,025	52,512	62,589	56,430
Wisconsin	77,039	66,531	140,053	85,088
Wyoming	2,755	4,854	6,225	5,333
Unspecified	8,760	†25,533	17,732	63,233
	4,889,372	†4,668,359	†6,920,618	5,070,190
Foreign countries	65,628	23,641	†91,382	3,810
Total shipped from cement plants	4,955,000	4,692,000	7,012,000	†5,074,000

*Includes estimated distribution of shipments from two plants in January and February, 1930; from three plants in January, 1931; from four plants in February, 1931. †Revised.

PRODUCTION AND STOCKS OF CLINKER BY MONTHS, IN 1930 AND 1931, IN BARRELS

Month	1930—Production	1931	Stocks at end of month 1930	1931
January	10,504,000	8,129,000	9,646,000	10,384,000
February	10,008,000	7,473,000	11,572,000	*11,962,000
March	13,045,000	9,556,000	13,503,000	13,322,000
April	15,025,000		15,164,000	
May	16,607,000		14,668,000	
June	15,895,000		13,452,000	
July	15,069,000		11,684,000	
August	15,244,000		9,275,000	
September	14,577,000		7,783,000	
October	13,895,000		7,266,000	
November	11,639,000		7,758,000	
December	9,484,000		8,809,000	

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN MARCH, 1930 AND 1931, AND STOCKS IN FEBRUARY, 1931, IN BARRELS

District	Production 1930—March—1931		Shipments 1930—March—1931		Stocks at end of month 1930	1931	Stocks at end of Feb., 1931*
Eastern Penn., N. J., Md.	2,717,000	2,293,000	2,311,000	1,724,000	7,095,000	6,622,000	6,054,000
New York and Maine	618,000	437,000	472,000	381,000	1,702,000	2,013,000	1,957,000
Ohio, Western Penn., W. Va.	1,205,000	444,000	724,000	595,000	3,882,000	3,554,000	3,705,000
Michigan	383,000	73,000	411,000	286,000	2,734,000	2,600,000	2,814,000
Wis., Ill., Ind. and Ky.	1,129,000	797,000	696,000	526,000	4,578,000	4,237,000	3,966,000
Va., Tenn., Ala., Ga., Fla., La.	1,099,000	923,000	970,000	1,041,000	1,728,000	1,676,000	1,794,000
East'n Mo., Ia., Minn., S. D.	971,000	869,000	502,000	494,000	3,864,000	3,833,000	3,458,000
Western Mo., Neb., Kansas, Okla. and Ark.	945,000	638,000	838,000	520,000	1,941,000	2,196,000	2,077,000
Texas	694,000	489,000	627,000	456,000	845,000	773,000	740,000
Colo., Mont., Utah, Wyo., Ida.	240,000	192,000	163,000	126,000	518,000	552,000	486,000
California	873,000	830,000	816,000	770,000	1,187,000	998,000	938,000
Oregon and Washington	351,000	242,000	296,000	253,000	574,000	573,000	583,000
	11,225,000	8,227,000	8,826,000	7,172,000	30,648,000	29,627,000	28,572,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1930 AND 1931, IN BARRELS

	1930—Production—1931		1930—Shipments—1931		Stocks at end of month 1930	1931
January	8,498,000	6,595,000	4,955,000	4,692,000	27,081,000	*27,759,000
February	8,162,000	5,920,000	7,012,000	*5,074,000	28,249,000	*28,572,000
March	11,225,000	8,227,000	8,826,000	7,172,000	30,648,000	29,627,000
April	13,521,000	.....	13,340,000	.....	30,867,000	.....
May	17,249,000	.....	17,224,000	.....	30,891,000	.....
June	17,239,000	.....	18,781,000	.....	29,364,000	.....
July	17,078,000	.....	20,153,000	.....	26,289,000	.....
August	17,821,000	.....	20,299,000	.....	23,824,000	.....
September	16,124,000	.....	18,083,000	.....	21,889,000	.....
October	14,410,000	.....	15,599,000	.....	20,697,000	.....
November	11,098,000	.....	8,784,000	.....	23,056,000	.....
December	8,480,000	.....	5,688,000	.....	25,883,000	.....
	160,905,000	.....	158,744,000	.....	.....	.....

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN MARCH, 1930 AND 1931, IN BARRELS

District	1930—Production—1931		Stocks at end of month 1930	1931
Eastern Pennsylvania, New Jersey, Maryland	3,120,000	2,489,000	2,223,000	1,892,000
New York and Maine	627,000	669,000	987,000	1,314,000
Ohio, Western Pennsylvania, West Virginia	1,341,000	623,000	1,643,000	1,645,000
Michigan	716,000	381,000	1,705,000	1,852,000
Wisconsin, Illinois, Indiana, Kentucky	1,626,000	980,000	2,011,000	1,741,000
Virginia, Tennessee, Alabama, Georgia, Florida, Louisiana	1,195,000	933,000	879,000	902,000
Eastern Missouri, Iowa, Minnesota, South Dakota	1,255,000	1,137,000	1,018,000	1,006,000
Western Missouri, Nebraska, Kansas, Oklahoma, Arkansas	1,031,000	716,000	475,000	871,000
Texas	656,000	430,000	507,000	300,000
Colorado, Montana, Utah, Wyoming, Idaho	207,000	203,000	235,000	287,000
California	877,000	813,000	1,268,000	1,085,000
Oregon and Washington	394,000	182,000	552,000	427,000
	13,045,000	9,556,000	13,503,000	13,322,000

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1930 AND 1931

Month	1930—Exports—1931 Barrels	Value	Barrels	Value	1930—Imports—1931§ Barrels	Value	Barrels	Value
January	82,387	$293,135	41,199	$115,678	201,609	$207,461	97,057	$132,937
February	64,267	217,798	25,703	88,989	114,455	119,717	22,370	26,250
March	117,563	357,896	.....	.....	43,622	59,981	.....	.....
April	57,419	200,217	.....	.....	140,871	178,226	.....	.....
May	57,423	198,170	.....	.....	94,696	111,998	.....	.....
June	82,077	223,639	.....	.....	55,356	74,370	.....	.....
July	47,082	166,577	.....	.....	12,404	20,973	.....	.....
August	49,031	167,579	.....	.....	35,323	39,029	.....	.....
September	46,594	153,384	.....	.....	51,096	59,721	.....	.....
October	62,690	190,305	.....	.....	75,284	84,364	.....	.....
November	50,495	151,555	.....	.....	109,124	125,448	.....	.....
December	38,680	134,260	.....	.....	44,157	59,641	.....	.....
	755,708	$2,454,515	.....	.....	977,997	$1,140,929	.....	.....

Kansas City Sand Producer Extends Dredging Area

A FIVE-YEAR LEASE on 23 acres in the Argentine district and a mile of Kaw river waterfront were obtained recently by the Peck-Thompson Sand and Material Co., Kansas City, Mo., from the Fidelity National Bank and Trust Co., trustee for the owner, the United Zinc and Chemical Co.

The 23-acre site is on the north side of the Golden Belt highway, which is a continuation of Kansas Avenue. The Kaw river forms the northern boundary of the tract, which is served by switch tracks of the Santa Fe railroad and together with the remainder of the zinc company's property, comprising about 100 acres with two miles of switches, is the gateway to about 1500 acres of potential switch property lying in the wide bend formed by the river there.

Large Expenditure for Equipment

About $40,000 will be spent by the Peck-Thompson interests in installation of equipment for the dredging and handling of sand, of which an unusually fine quality is obtainable in that particular section of the Kaw river.

A large house on the tract will be equipped as an office and operating headquarters for the sand company.—*Kansas City* (Mo.) *Post.*

Exports and Imports†*

Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN FEBRUARY, 1931

Exported to	Barrels	Value
Canada	1,055	$5,851
Central America	1,978	5,528
Cuba	2,626	5,828
Other West Indies and Bermuda	1,239	2,482
Mexico	2,033	7,709
South America	13,494	41,285
Other countries	3,278	20,306
	25,703	$88,989

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN FEBRUARY, 1931

Imported from	District into which imported	Barrels	Value
Belgium	New York	3,809	$3,648
Denmark	Porto Rico	3,979	$4,202
France‡	New York‡	173	$391
	Los Angeles‡	173	399
	Total	346	$790
Germany	Los Angeles	2,975	$5,538
	San Francisco‡	40	69
	Total	3,015	$5,607
Japan	Hawaii	11,221	$12,003
	Grand total‖	22,370	$26,250

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO IN FEBRUARY, 1931

	Barrels	Valu
Alaska	28	$72
Hawaii	27,064	68,387
Porto Rico	1,020	1,497
	28,112	$69,956

*The value of exports of domestic cement is the actual cost at the time of exportation in the ports of the United States whence they are exported, as declared by the shippers on the export declarations.

†The value of imported cement represents the foreign market value at the time of exportation to the United States.

‡White nonstaining portland cement.

‖Includes 386 bbl. white nonstaining portland cement, valued at $859.

§Includes white nonstaining portland cement.

Town Accepts 5c. Per Cu. Yd. Royalty for Sand and Gravel

AT A MEETING of the Brookhaven, Long Island, N. Y., trustees, it was decided to end the controversy which has revolved around the price to be charged the Great Eastern Sand and Gravel Co. for gravel taken from the town lands under the western part of Port Jefferson Harbor. The price was fixed at 5c. per cu. yd., the same figure charged in previous leases.

The Great Eastern company, which has been dredging in Port Jefferson Harbor for many years, sought an extension of its lease last October which would permit it to dredge in the western part of the harbor. This was fought by civic organizations and by private individuals.

In proceedings to restrain trustees from making the lease, W. G. Waller, of the O'Brien Sand and Gravel Co., testified that his company would have paid 7½c. for the Port Jefferson Harbor gravel. It was after an adverse ruling of the petition for an injunction that the trustees authorized the Great Eastern company to move into the western part of the harbor.—*Riverhead* (N. Y.) *Review.*

Rock Products Clinic

For a Rock Products "Clinic"

THE EDITOR.—It has often occurred to me, and I have wondered if you ever considered a department in connection with ROCK PRODUCTS that would be sort of a "clinic." One to which sick rock product plants could turn for help. A department that could analyze conditions of such plants and suggest and possibly correct conditions that seem causes for the existing condition.

While this would be beyond the scope of publishing a trade journal, still I know of no better agency to reach all producers of rock products, and no better agency to be of real help than your publication.

Right now, and when conditions begin to improve, there will have to be a lot of readjusting done, and the fellow who can and will shape his course now will have the first call when the times improve.

Such a department could be of real service to the rock products industry. I do not mean that such service should be furnished gratis, but to charge enough to clear all expense and to make the one receiving the services feel that he is getting real value.

A number of years ago I was pointed out to a Wisconsin lime producer who wanted to know something about the burning of lime. He told me his difficulty was that his lime would not slake readily, that it seemed to have a glazed coating. When asked how long he burned his lime he replied six hours. I told him to burn it four hours and see what results he would have. Upon my return home I received a letter from him informing me that he not only greatly increased his output but that his lime was of a much better quality.

I mention this to show what helpful service can be rendered if the person requiring help will make it known.

Such a department in connection with ROCK PRODUCTS would be up-to-date continually because of its close touch with the industries.

I think none of us gets as much enjoyment out of anything we do as when we are of real service to someone.—A. S. DERINGER, Oak Harbor, Ohio.

* * * * *

DEAR MR. DERINGER.—Your suggestion of a service bureau as part of ROCK PRODUCTS' service to its industries is extremely interesting. I have often wanted to establish a real research laboratory in connection with ROCK PRODUCTS, and I think it could be entirely justified and may come some time.

In regard, however, to establishing a department to give *specific* advice on *specific* operations, for a consideration, while it sounds mighty effective on the face of it, you can readily see that a publication would soon be involved in all kinds of difficulties.

Not Entirely a New Feature

WE HAVE OFTEN felt inclined to start a new department of Rock Products devoted exclusively to the correspondence of readers; for the editors have quite a voluminous correspondence on a great variety of subjects.

Certain considerations have kept us from doing this: One is that we are very reluctant to devote any more space in the paper to regular departments; we feel we need it for articles. Another reason is that the editors have doubted if many of the things discussed in their correspondence were of very general interest.

Nevertheless, a considerable amount of material has been allowed to accumulate. Herewith is a sample. If it proves interesting and helpful we'll continue it, although maybe not regularly.

Our "Hints and Helps" department has always been sort of a "clinic" for operating men. But the columns of this page are to be open for discussion of any relevant subject—and we hope subscribers will be as free and open in airing their views as the editors are sometimes accused of being in airing theirs.—The Editors.

But we can lend our aid to help every producer who asks for it through these columns; and where we cannot answer his question from our own knowledge and experience, we surely will be glad to ask the assistance of the producers in the industry. However, there'll be no pecuniary consideration for ROCK PRODUCTS. We will pay for contributions here, though, the same as in other parts of the book; and we'll trust that the new feature will be sufficiently interesting and helpful to justify the space we give it.—THE EDITOR.

Beg Your Pardon!

WE TAKE EXCEPTION to the article on the rock products industry in Alabama, in ROCK PRODUCTS, March 14, wherein it is stated that our material is of comparatively small size; for the mechanical analysis actually shows it to run a better uniform grading, from 2½-in. to ¼-in., which is the maximum size for road work and other heavy concrete work, than any other material produced in this locality. We, of course, do produce two grades, the second grade being that passing a 1-in. screen and retained on a ¼-in., which is for reinforced concrete work.—M. D. AVIRETT, Sales Manager, The Georgia Gravel Co., Columbus, Ga.

Government Report on the Monocacy Quarry Viewed for Operators by a Non-Operator

By W. E. Farrell
President, Easton Car and Construction Co., Easton, Penn.

THE AUTHOR, the owner, the operators, and all who took part in the compilation of I. C. 6405, published by the United States Bureau of Mines and abstracted in the February 28 issue of ROCK PRODUCTS, are to be complimented and congratulated. No one who is not a fiend for figures could possibly realize the labor entailed in computing and compiling this report.

The mass of data contains much good meat, but to digest it and compare it with one's own operation would require almost as much talent as the author's.

The purpose of this review is not to tear down or criticize this report in any way, but is an effort to rearrange the information and data so it may possibly be more easily compared with the results of other operators as ordinarily compiled. For further data and more complete information, these can be derived from the report itself.

The report might possibly be justly criticised from the standpoint that while the gross season's tonnage is given at 441,915 tons, the tonnage per hour or per day is not clearly defined, and to arrive at it the only reference available is the information given on p. 21 of the report, wherein it states:

"This plant operated 283 days, averaging 55 hours per week."

You might assume that this represents 47.17 weeks, or 2594.35 hours, or 260 days of an average day of 10 hours. In this case, the season's output would indicate an average output of 1700 tons per day of 10 hours.

The following table and data of costs present at a glance the costs of delivery of the stone through the screens.

The costs of stripping and primary blasting are segregated in one group as they are possibly not applicable to, or certainly are variable with, peculiar conditions surrounding every operation. There are combined in the second group the operations of secondary drilling and blasting, shovel loading, crushing and screening, as these operations are to a great extent common in all quarries.

No account in this compilation has been taken of the charges for supervision, water rights, general charges, etc., in order to keep figures as comparable as possible.

As being of possible further interest, calculations have been made as to the cost of transportation, from the data given and after some correspondence with the author; and while this information follows, it is not

SUMMARY OF PRODUCTION COSTS, MONOCACY QUARRY—PRODUCTION, 441,915 TONS
(Reprinted from the U. S. Bureau of Mines Information Circular 6405)

Table 1	Labor	Cents per ton	Fuel	Cents per ton	Supplies	Cents per ton	Repairs—M. & L.	Cents per ton	Total	Cents per ton
Stripping	$ 4,822.13	.0109	$ 2,507.06	.0056	$ 909.17	.0020	$ 2,455.94	.0056	$10,694.30	.0240
Primary drilling and blasting	4,307.08	.0098	746.05	.0017	9,191.83	.0208	2,707.97	.0061	17,367.26	.0394
Total for stone on quarry floor	9,129.21	.0207	3,253.11	.0073	10,100.96	.0228	5,163.91	.0117	28,061.56	.0634
Table 2										
Secondary drilling and blasting	5,916.27	.0134	7,199.45	.0163	9,088.41	.0205	615.65	.0014	22,819.78	.0516
Shovel loading	13,815.04	.0314	4,344.87	.0098	334.10	.0008	12,912.19	.0291	31,406.20	.0711
Transportation	4,235.06	.0096	3,199.99	.0072	500.65	.0011	7,619.09	.0172	15,554.98	.0351
Crushing and screening	8,015.05	.0180	23,769.50	.0537	3,204.09	.0072	33,468.92	.0757	68,457.56	.1546
Total for stone from quarry floor to bins or shipment	31,981.42	.0724	38,513.81	.0870	16,127.25	.0296	54,615.85	.1234	138,238.52	.3124

guaranteed to be absolutely correct to every decimal place since it was necessary to reconcile some of the information.

COST OF TRANSPORTATION

Season, days	264
Hours per day	10
Load per car, tons	8.3
Cars per train	3
Tons per train	24.9
Trains in service	3
Total tons per season	450,753
Total tons per train	150,251
Size of locomotive, tons	18
Number shovels	2
Size dipper, yds.	4
Cars dumped per year	54,309
Trains dumped per year	18,103
Length round trip, feet	2,600
Costs per train per year	
Engineer	$1,411.69
Fuel	947.66
Repairs, L. & M.	1,677.65
Lubricants	29.80
Miscellaneous	137.09
Track L. & M.	861.77
Total	$5,065.66
Production per train—200 days of 10 hours	
Haul, feet round trip	2,600
Tons per train	24.9
Tons per season per train	113,700
Trips per season per train	4,622
Miles per season per train	2,276
Tons per day per train	568.5
Trips per day per train	23.11
Miles per day per train	11.4
Mintues per trip per train	26.6
Number shovels	2
Dipper, cu. yd.	4
Tons per dipper, averaged at 60% of rated capacity	3¼
Dipper loads per hours per shovel	31
Costs per day per train	
Engineer	$5.340
Fuel	3.590
Repairs, L. & M., cars	6.356
Repairs, L. & M., track	3.264
Lubricants	0.109
Miscellaneous	0.519
Total	$19.187
Costs per ton	
Engineer	$0.00949
Fuel	0.00632
Repairs, L. & M., cars	0.01118
Repairs, L. & M., track	0.00574
Lubricants	0.00019
Miscellaneous	0.00091
Total	$0.033383
Costs per mile	
Engineer	$0.4700
Fuel	0.3155
Repairs, L. & M., cars	0.5585
Repairs, L. & M., track	0.2868
Lubricants	0.0096
Miscellaneous	0.0456
Total	$1.6860
Cost per ton mile	$0.0689

Public Works Construction Going Strong

WITH LONG TERM state and municipal bond issues and concrete surface pavement awards setting new high records during March, fulfillment of their earliest prediction that highway and public works construction are in for a banner year is foreseen by the Associated General Contractors of America.

An analysis of construction trends just completed by the association shows that state and municipal bond issues for March were larger than for any other month on record, with the exception of the peak month of December, 1929. The March issues totaled $275,000,000, according to preliminary figures compiled by *The Bond Buyer*, and averaged $148,000,000 per month for the first quarter of the year.

Concrete surface pavement awards during March broke all previous records for the month and have been exceeded only twice before during any month on record, the analysis reveals. Although the awards for streets and alleys have been below average, the total for road work during the first three months of 1931 has been unprecedented, never before having been equaled in comparable periods.

The total awards for March, according to figures compiled by the Portland Cement Association, were 19,466,568 sq. yd., or an increase of 45% over those of March a year ago, while the total for the first three months was 38,976,870 sq. yd., or an increase of 43%. The March awards, which practically equaled the combined total of the first two months, have been exceeded only by those for the months of May, 1928 and 1929, and in neither of those months were the road totals so large.

In commenting upon the analysis, Edward J. Harding, managing director of the Associated General Contractors, predicted that in view of the greatly expanded and liberalized federal aid highway program, the trend of road work awards will continue to ascend until much later in the season than usual and that possibly the peak will not be reached until after mid-year.

Charts of the association show, however, that due to the continued low level of private building operations, the volume of all construction work performed during the first quarter of 1931, as determined by shipments of basic construction materials, was smaller than at any time since 1922. The March volume, according to the association's chart, decreased 21 points from the February figure to index number 78.

Illinois Governor Petitioned to Use Illinois Cement Only

GOVERNOR LOUIS L. EMMERSON, of Illinois, received a delegation of 50 business men from the LaSalle county tri-city group, Oglesby, LaSalle and Peru, on March 30 and heard a plea that the state purchase cement for its hard road construction from the four mills within the state.

The delegation, headed by the mayors of the three cities, Charles Spurr, Oglesby; Frank Bryzgot, LaSalle, and Al Hasse, Peru, appeared at the governor's office in the morning, but he was unable to hear the petition until afternoon. The delegation was supported by Senator N. M. Mason, Republican, Oglesby, and Represenatives Ole Benson, Republican, Ottawa; Edmond P. Connerton, Democrat, LaSalle, and R. G. Soderstrom, Republican, Streator.

The governor was presented with a petition signed by 7000 LaSalle county business men, pointing out the necessity that the state place its 1931 cement contracts with Illinois plants as a means of forestalling a marked increase in unemployment and curtailment of industrial operations in the tri-city district.—*Dixon* (Ill.) *Telegraph.*

* * * * *

In awarding the contracts April 7, H. H. Cleaveland, director of the Department of Public Works and Buildings, said, in part:

"The department has made every reasonable effort to give preference to Illinois mills in the allocation of its cement contracts and has awarded cement only to those outside companies having mills bordering on the state line, which are exclusive users of Illinois coal, and further which have by their actions contributed materially to the present favorable price which the state enjoys.

"If our purchases had been confined exclusively to Illinois cement mills, the result would have been that the operations of a number of large coal mines in the southern Illinois district would have been seriously curtailed and several hundred miners would have been thrown out of employment."—*Chicago* (Ill.) *Post.*

Texas Highway Engineers and Aggregate Producers Hold a Get-Acquainted Meeting

AN INTERESTING and well attended meeting somewhat in the nature of a school was held at the Texas State Highway Testing Laboratory at Austin, Tex., April 6 and 7, 1931, for the purpose of better acquainting the producers of aggregates with the work of the highway department and to bring about a better understanding and co-operation between the plant operators and the highway department.

The meeting was arranged following the suggestion of W. W. Carson, Jr., secretary of the Texas Crushed Stone and Gravel Association, by W. H. Wood, engineer of materials and tests, state highway department, who invited the superintendents of the various plants producing aggregates used on state highway work to be present on those dates.

As a result some 35 superintendents were in attendance and the meeting proved to be of much interest and value to all concerned.

Following an inspection of the various departments of the laboratory and of the manner in which the different tests are carried on, W. E. Youngs, research engineer for the department, gave a talk extending over part of both days, explaining the methods used in determining specific gravity, percentage of voids and the design of concrete mixes, and also explaining the use of the tri-axial diagram to show the percentage of voids for differences in gradation.

Demonstration of Specific Gravity Determinations

The methods were further explained and illustrated by making an actual determination of the specific gravity of a given sample of coarse aggregate by means of the pycnometer and torsion balance; also the results of high or low percentages of voids in the coarse aggregates were shown by mixing and testing by both slump test and flow table two different concrete mixes containing coarse aggregates having widely different percentages of voids.

The importance of having a low percentage of voids in the coarse aggregate in order to keep down the amount of sand necessary in the mix and thus obtain higher strengths and better workability was brought out.

The pycnometer method of determining specific gravity, used because of its greater accuracy, was shown to consist of three determinations; namely, weighing the sample (in a saturated surface dry condition), weighing the pycnometer full of water, and weighing the pycnometer with the sample in it and filled with water. The pycnometer is simply a fruit jar arranged with a conical top, which has a small opening so that a constant volume may be maintained. The sample partly fills the jar.

W. W. Carson, Jr.

Thus the weight of the jar filled with water, plus the weight of the sample, minus the weight of the jar filled with water and with the sample in it, represents the weight of the equivalent volume of water displaced by the sample, and this divided into the weight of the sample gives the specific gravity.

The various explanations and demonstrations indicated the reasons for the present grading specifications necessary to obtain high strength concrete and indicated how the operators may help themselves in preparing coarse aggregates with a minimum of voids, as well as showing how they may make their own checks on their products.

Co-operating to Eliminate Plant Wastes

J. M. French, paving engineer for the department, whose work consists to a large extent in getting contractors started with proper mixes, also stated that the department was trying to minimize waste at the plants by using a gradation of coarse aggregates which would give minimum voids so far as possible.

Both Mr. Wood and Mr. French brought out the point that they were trying in every way consistent with good concrete practice to reduce the aggregate plant's wastes and to co-operate with the producer in every way possible.

The concrete used in paving work by the department is designed by the absolute or solid volume method, the weights of saturated, surface dry materials being used in the calculations, and the scale weights corrected if necessary according to the absorption or free moisture content in case they are not in dry condition when used.

That is, the scale weights are increased for free moisture and decreased for absorption. Also the water used is increased according to the percentage of absorbed moisture and decreased for free moisture.

A workability factor of 0.80 to 0.85 is used in proportioning the coarse and fine aggregates, this being varied to give the desired workability. In other words, the saturated, surface-dry, loose weight per cubic foot of the coarse aggregate is divided by the solid weight per cubic foot as calculated from the specific gravity, and this result (which is the complement of the percentage of voids in the coarse aggregate) is multiplied by 0.80 to 0.85 to obtain the cubic foot (solid volume) of coarse aggregate per cubic foot of concrete.

Thus in proportioning the mix the yield, or cubic feet of concrete per sack of cement, is found by dividing 27 cubic feet by the number of sacks of cement to be used per cubic yard of concrete.

The gallons of water required to be used per sack of cement are divided by 7.5 (the gallons of water in a cubic foot) to obtain the cubic foot of water per sack of cement, and this plus the constant 0.485 (cubic foot of solid volume of cement per sack of cement) gives the combined solid volume of water and cement per sack-batch.

The total volume or yield per sack of cement minus the combined solid volume of water and cement gives the solid volume of coarse and fine aggregates, and subtracting from this the solid volume of coarse aggregate, found as indicated above, leaves the solid volume of fine aggregate.

These solid volumes per sack of cement are then converted back to pounds and these saturated surface dry weights corrected for free moisture and absorption as already indicated. Weights for more than a one-sack batch are of course found by multiplying by the number of sacks in the batch.

In the field determinations for loose weights ½ cu. ft. cylindrical measures are used.

Mr. Wood stated that the department had been authorized to proceed with two research projects, one on coarse aggregates, and one on binders.

The research on coarse aggregates will include further gradation tests at all pits and the effect of varying percentages of voids and various sizing with lower cement factors on the strengths of both cylinders and beams.

The importance of being able to reduce the cement factor, which has already been cut from 6½ to 5 or less sacks per cubic yard of concrete, was pointed out, since the saving of one sack of cement per cubic yard means a saving of $1500 per mile of concrete road.

Mr. Wood also stated that he hoped to be able after further research to get away from the complications of present grading re-

quirements and be able to specify simply top and bottom sizes with maximum allowable percentage of voids, which would allow somewhat more leeway in the preparation of the coarse aggregate.

The research on binders will include work on clay and limestone binders, caliche, iron ore, clay marl and the salt sands of the Gulf Coast, and it is hoped to obtain more exact and accurate information than is now available.

It is also expected to carry on research work later on the effect of the variations in voids of different sands used as fine aggregate.

Attendance

Dallas Washed and Screened Gravel Co.; J. W. Degenhart, C. P. Hadley.
Dittlinger Lime Co.; W. J. Heitkampf, Adolph Koepp, Louis Nolte, A. A. Reininger.
East Texas Gravel Co.; R. E. Randal.
Fort Worth Sand and Gravel Co.; W. R. Thomas.
Gifford-Hill and Co.; A. J. Anthony, Charles Thompson.
W. D. Haden Co.; Sid Clark.
Horton and Horton; P. R. Gossiott, W. G. Thomas.
Landa Rock Products Co.; C. Westbrook.
More and Moore Sand and Gravel Co.; V. H. Montgomery.
New Braunfels Limestone Co.; Max A. Altgelt.
Potts-Moore Gravel Co.; C. W. Crisler, S. A. Moore.
San Antonio Portland Cement Co.; F. W. Chapman, C. L. Lundy.
Southwest Stone Co.; T. F. Sharp, W. R. Thacker, W. F. Wise.
Texas Construction Material Co.; T. J. Beesley, W. B. Du Pré, W. T. Du Pré, W. D. Johnson, L. S. Lawrence, R. L. McMillian, H. Moreland, S. G. Smalley, W. C. Torbett, Jr., I. Zatopek.
Texas Crushed Stone and Gravel Association; W. W. Carson, Jr.
Texas State Highway Department and Laboratory; R. F. Dawson, J. D. French, A. L. Love, W. H. Wood, W. E. Youngs.

Storage in Gravel Pits

LIONEL V. BARTON writes in the British paper *Cement, Lime and Gravel* on storage in gravel pits. He advocates the starting of a new operation with portable or semi-portable plants, the permanent plant being built when the property has been sufficiently developed or prospected to justify the expense of a large installation. At this stage there should be consideration of better and more permanent storage capacity. The paper says:

"There is no question that the provision of large capacity in storage is the most important element in continuous and economical production, temporary falling off of the demand, for any one size usually entails the dumping of some sizes on the floor of the pit and handling two or three times."

The particular form of storage advocated by Mr. Barton is one that is built on worked-out ground. He says of it:

"Therefore if plans of development are made in the early stages large storage bins can be erected at low cost in the portion worked out, the remaining bank being used as the base of the hopper and the division walls being built on this bank. The angle of the base of the hoppers can be arranged to suit the angle of repose of the gravel; this of course varies with the sizes. It is better to have the bottom at a slightly less angle in every case than the angle of repose, to eliminate the wear of sliding."

He advocates having the outlet door higher than the floor so as to retain some gravel on the bottom to take the wear. A second door on the bottom is provided in case the bin is to be wholly cleaned out. With this scheme the flooring can be of thin concrete laid directly on the ground. Or if the ground is hard it will serve as a bottom without any flooring.

The construction of the front wall is the all important feature in this type of bin because it supports the entire pressure of the gravel. The paper says that it may be made of brick or stone masonry, concrete block or monolithic concrete, reinforced or without reinforcing. In most situations reinforced concrete will be found much the cheapest, as masonry walls of any kind have to be made very thick to secure stability.

The article includes the calculations for finding the moment of stability and so on, and these show that reinforced concrete has very much the advantage for most situations, but the paper says there may be exceptional conditions where building stone is so cheap and handy that its use may be considered. Storage bins built this way have been extended until they can contain many thousands of tons, according to this paper.

Lump or Hydrated Lime for Locomotive Water-Softening Plants?

LIME MANUFACTURERS will doubtless be interested in the answer to the inquiry above, given by *Railway Engineering and Maintenance*, a monthly journal published for railway officials. Here it is:

"From the standpoint of operation, hydrated lime possesses many advantages over lump lime, among which are the following:

"1. It can be stored without risk of fire if it comes in contact with water.

"2. It is delivered in packages of definite weight, generally 50 lb., which are more convenient to handle than the lump lime, which is furnished either in bulk or in barrels.

"3. It does not deteriorate appreciably during a reasonable period of storage, while lump lime deteriorates during shipment and even under the most favorable conditions of storage.

"4. Hydrated-lime solutions do not require screening for handling through pumps or small orifices.

"5. More uniform results and greater accuracy of treatment are obtained than with lump lime, because of the greater ease of control.

"While all of these advantages are important from an operating standpoint, accuracy of treatment stands first. It is true that accurate results can be and are obtained with lump lime, yet its use requires practically air-tight storage bins and special methods and care in slaking, as well as special training in the methods of slaking.

"On the other hand, hydrated lime is slaked when received, so that it is only necessary to apply a specified amount to a given quantity of raw water. Because it is a dry powder, it passes readily through dry-feeding devices. Because of its uniformity and ease of handling, it is used almost universally in municipal water softening. Its use is not only preferable from an operating standpoint, but in practically every case of railway water supply it is more economical. The Committee on Water Service and Sanitation of the A. R. E. A., after a thorough study of the subject, concluded that hydrated lime is more economical than lump lime at plants where the amount of water treated daily is less than 2,000,000 gal."

Sand for Sand Asphalt Paving

W. E. HAWKINS, construction engineer of the North Carolina Highway Department, says that something like 500 miles of sand-asphalt roads have been laid in parts of North Carolina where other materials than sand were not readily available. His paper, read before the Ninth Annual Asphalt Paving Conference, says the first step towards starting construction should be an assured supply of sand, which should consist of clean, hard, durable grains, free from clay, loam and other foreign matter. Gradings that have been used on recent jobs are:

Retained on—			
40-mesh	20.4%	41.6%	25.0%
80-mesh	38.8	35.3	45.6
200-mesh	35.6	21.1	24.8
Passing 200-mesh	5.2	2.0	4.6

The most satisfactory sand is said to be one which closely approximates the grading used in sheet asphalt. As this is rarely available, it is necessary to use care in balancing the proposed mix. This is accomplished by carefully determining the percentage of voids and establishing a formula in the laboratory which will properly fill the voids.

Another paper on sand-asphalt roads was given at the conference by H. C. Holden, district engineer, Massachusetts Department of Public Works He gives the following specifications for the aggregate for sand asphalt. This aggregate is a "composite," a mixture of sand and stone screenings:

COMPOSITE

Passing ¾-in. screen, 100%.
Passing ¾-in. screen, retained on ¼-in. screen, 1% to 17%.
Passing ¼-in. screen, retained on No. 10 screen, 6% to 26%.
Passing No. 10 screen, retained on No. 30 screen, 20% to 68%.
Passing No. 30 screen, retained on No. 100 screen, 7% to 45%.
Passing No. 100 screen, retained on No. 100 screen, 0% to 15%.

Experiments have been made with the use of ground limestone and this seems to give a slightly more stable surface. The cost of the ground limestone is thought to be slightly less than the cost where stone screenings are used.

Keeping Step in Accident Prevention

Regional Meeting of Cement Plant Representatives at Kansas City, Mo., One of the Best

SHOWING the same intense interest in the safety work within the cement industry that has marked previous 1931 Portland Cement Association regional safety meetings, approximately 80 representatives of the five member plants of Kansas, Missouri and Nebraska gathered at Kansas City, March 19, for one of the most successful safety meetings in the history of the region. The meeting was held at the Kansas City Athletic Club and presided over by Chairman **C. M. Carman,** superintendent of the Universal Atlas Portland Cement Co. plant at Independence, Kan.

Other cement plants represented at the meeting were the Ash Grove Lime and Portland Cement Co. plants of Chanute, Kan., Kansas City, Mo., and Louisville, Neb.; the Lone Star Portland Cement Co. plants of Bonner Springs, Kan., and Kansas City; the Missouri Portland Cement Co. plants at Independence, Mo., and St. Louis, Mo. In addition to the representatives of the regional plants, F. C. Schieber, superintendent of Cia Uruguaya de Cemento Portland of Montevideo, Uruguay, was also in attendance.

The morning session of the meeting was featured by an address of welcome delivered by F. C. Lynch, director of the Kansas City Safety Council; five short talks on "The Most Effective Idea Used by Our Company Last Year to Prevent Accidents," and two papers, "Eye Injuries in the Portland Cement Industry, Their Prevention and Care," by Dr. C. E. Hassig, Bonner Springs, Kan., and "The Elimination of Eye Hazards," by J. L. Stevenson, American Optical Co., Kansas City.

Monthly Race Was Biggest Idea

"The most effective idea of accident prevention used by our company last year was the monthly race among four teams," **David W. Webb,** speaking for the Ash Grove Lime and Portland Cement Co., said. "Each team was made up of an equal number of employes and had a captain and two lieutenants; also a color designation. Every employe wore a celluloid button, corresponding to his team color, for identification.

"The idea of the race was to prevent lost-time accidents and to keep safety always before the men. There is no doubt that our minor accident record was increased by our insistence that no matter how trifling a scratch might be, it had to be reported for first-aid treatments. We

C. M. Carman

are sure that in the list of minor casualties are hidden several potential lost-time accidents that were prevented by first-aid treatment.

"In order to score the results of the race, a large bulletin board, measuring 12 by 14 ft., was erected in a conspicuous place near the plant entrance. On this board were painted four large clock faces, approximately 4 ft. in diameter, graduated by 120 divisions, making four parts for each day of the month. Daily standings of the teams were indicated by the clock hands.

"The race was scored entirely on the accidents reported to the first-aid room. Each day the hands of the clock, representing the team having no injuries, was advanced four points. For each scratch or bruise of any sort, the person had to report for first aid within 30 minutes. The team lost only one point for each injury so reported, but if the injury was not reported within the allotted time, the team was penalized four points. A lost-time accident eliminated the team from the race for that particular month. Fortunately, we had no lost-time accidents last year, although we were disqualified from receiving a trophy by having a slight permanent disability."

R. E. McDonald, speaking for the Lehigh Portland Cement Co. plant at Iola, Kan., declared that a contest which that plant has conducted with one of the eastern Lehigh mills has helped a great deal in the reduction of accidents.

"In 1921 we challenged one of the Lehigh mills in the east to a 12-month period of competition," he said. "In that year we tied with them. In 1922 they beat us; in 1923 we were able to show better results than they. I think that during those three years this contest had considerable to do with finding out how to reduce accidents at the Iola mill.

"Education of the men was stressed more than in previous years; especially were the foremen urged that they must train their men more in the way of safety."

To keep up the interest in safety work among the workers, Mr. McDonald stated that the company has inaugurated a competitive system similar to that used by the Ash Grove Lime and Portland Cement Co.

Four factors were credited by **H. B. Irving** of the Missouri Portland Cement Co. with being instrumental in accident prevention work. These were the monthly all-crew meetings, the safety committee, posters, and attention to minor accidents.

Four Activities Brought Results

In regard to the safety work within the Missouri Portland Cement Co. plants, Mr. Irving spoke as follows:

"Relief from accidents can be obtained through two methods, education and the elimination of accident hazards. We have set apart one-half hour each month for an all-crew safety meeting. In order that the meeting may not be overlooked, notices are posted on the bulletin board two days in advance, and on the morning of the meeting each foreman is notified by the safety department. The safety department is constantly talking safety to the men and trying to give them every possible help. We try to secure some outside speaker for each meeting. These speakers can and do talk safety to the meeting in a different manner than our safety department, and have been a great help in the education of the workmen. The Red Ringers orchestra has been organized and is a valuable help in the entertainment part of the safety program.

"In addition to the all-crew meeting we have the safety committee meeting, which is held every two weeks. Each depart-

ment in the mill is represented on this committee. The workman who represents the department is appointed by the foreman and is required to serve for two weeks. By this method every man in the mill is given a chance to do his part for safety. These men do not have any special time to make their inspections, but may go as often as they think necessary. They can also inspect any place or department. Notes are taken of any unsafe places or any unsafe practices of the workmen. Each inspector has his notes and reads them to the meeting. At the end of the meeting the secretary sends out written notices to the different foremen, giving them the recommendations made regarding their departments.

Original Posters Changed Often

"Our safety posters are made by our safety department. We have a safety bulletin board in each department for displaying posters on any special bulletins. These are changed every other day. By using posters of our own design we are able to put safety ideas to a department which are most suitable to that department. We find that our own posters appeal to the men much more than the posters put out by the different safety poster companies, as these sometimes are very highly colored and appeal more to the executives than to the workmen.

"Each man in our employ is given a card showing the standing rules of the company. To this card is attached an acknowledgment which is signed by him and this is kept on file in the office. The rule dealing with minor injuries reads: 'If any man receiving an injury, no matter how slight, does not report for first aid at once, he is given a lay-off for 30 days.' By this method of getting first aid we have eliminated all cases of infection in our plant."

J. H. Griffin of the Lone Star plant at Bonner Springs, Kan., declared that a system of physical examinations, started last year, was the most effective idea inaugurated during the year in accident prevention work at his plant. The men, he said, are not fired because of physical defects but are given work in safer places where their particular defects will not make their work hazardous.

F. J. Davis, of the Universal Atlas Cement Co., Independence, Kan., believed that the steps taken to protect the eyes of workmen made up the year's most important safety idea of his company. He pointed out that there were 31 different jobs in the cement mill where workmen should have goggles. The older men of the service, he declared, were the hardest to break into the use of goggles, and it was necessary to talk the plan up some time before its enforcement. The company started passing out goggles on a windy day and 12 men called the first thing in the morning to be fitted. Immediately afterwards, 63 men called on their own volition. Since goggles were put into use but one minor eye injury has occurred.

J. L. Stevenson of the American Optical Co. divided eye hazards into three classes: mechanical, physical, and chemical. In eliminating the first of these hazards, he declared, thorough workmanship must be present in the grinding of the lenses. In case of shattering, lenses should be so made that they will fly away from the eye. Men with defective visions, he declared, should be placed on non-hazardous work. Generally speaking, 40% of the men have defective visions. Thorough eye examinations are important in that the correct functioning of the eyes guides every move made by the workmen.

During the regional banquet, **P. C. Blaise**, general superintendent of the Missouri Portland Cement Co. plant at St: Louis, delivered an address entitled "Is Our Viewpoint Narrowed by Lost-Time Accidents?" He said in part:

"We are often reminded of the success we have made in reducing our lost-times. Many of our plants operate a year or more, accident free. Our frequency rate is at the top of the list. Compared to industry generally, we are sailing on comparatively smooth seas. I think that now is a good time for us to reconsider for a minute and ask ourselves if our drive at lost-time accidents, the really serious accidents, is not narrowing our viewpoint? Of course, we must continue to hammer at this type of accident. But can we not do it by a broader plan which will, in addition, reduce our minor reportable accidents, build up a smoother operating organization, and develop from each individual a man who will be worth more to himself, to us and his community?

"The result of an accident may be merely the loss of a few seconds' time. Or it may be a reportable injury, a lost-time injury, damage to equipment, or a plant shutdown. In any event there is one of two underlying causes: either improper training, or failure to think. That, then, defines our problem.

Train All in First Aid

"As a means to this end I might suggest a few measures. I believe we should all adopt a policy of 100% first-aid training. The course will not only teach application of first aid, but will bring out the weakness of our bodies and start men thinking of the necessity for measures to protect it.

"I believe our safety program should include frequent talks at regular intervals on subjects foreign to cement plant operation, and yet pertaining to safety.

"I would suggest a broader distribution of the work of carrying on our safety program. Let each foreman prepare a short talk on some phase of safety, but not as applied to cement plants, and present it at various department meetings. Let a department inspector in each department keep his own corner of the plant in safe mechanical shape. Get as many men as possible interested in the work of their local safety council and attending their meetings.

"Eventually, the net of the whole thing will be an organization of men who will have broader interests, who will have increased their store of information, and who will have shared responsibility of our safety work."

O. D. Nelson, chairman of the safety

Kansas City meeting of cement mill safety representatives

committee of the Ash Grove Lime and Portland Cement Co., delivered the first paper of the afternoon session. Speaking on the subject of "Investigation of Serious and Fatal Employe-Accidents," Mr. Nelson said in part:

"We believe more lasting results will be obtained by permitting the foreman to co-operate with his men in the investigation of serious accidents. At the same time this will encourage initiative that no outside agency can hope to develop. While a special committee will do much good and get some results, there will be a reaction that will tend to retard interest that should be taken by the department head.

"It is our experience that the department head sometimes looks to the safety committee to take care of his safety work for him. Such a report has been made when the foreman admitted his failure to have a mechanical condition corrected but also inferred that past safety committees were also responsible.

"We have endeavored to promote accident prevention without the use of arbitrary rules and with very few exceptions leaving it to the department head to exercise his best judgment in placing men on jobs for which they are best suited.

"While any method of investigating accidents, if intelligently followed, will achieve a degree of success, it is our belief that initiative and resourcefulness of the foreman and workmen will be aided by the absence of arbitrary rules."

"The human factor, judging by statistics," said **V. K. Newcomer,** superintendent of the Missouri Portland Cement Co. plant at Independence, Mo., "is 90% of all the grief. Since the 'big boss' is the controlling factor on his own lot, he has a great deal to do with the safety of the men under him." Continuing his talk on "Safeguarding Employes During Maintenance or Reconstruction Work," he said:

"Without doubt the mental attitude of the 'big boss' on safety is the biggest factor in the whole question. Is he really interested, does he care, does he carry on because that is part of the job and since they pay him to do it he does it, or is there in him that instinct to fight anything which interferes with his showing and good name? That's the boy, the one who hates to have to admit that he is unable to train his men so that they will work safely, and so he goes after accidents rough shod, driving this man who needs driving and leading this man who goes better when led, but always driving on to new accomplishment, never lets up for a second, but is always on the watch to spoil his record. If the 'big boss' is sold, the plant will follow him. If his attitude is that, there is no reason that there should be any more accidents on construction work than on operation."

In an address entitled "Methods of Maintaining Interest in Safety and Accident Prevention Work," **W. D. Ryan,** Bureau of Mines, U. S. Department of Commerce, traced the history of accident prevention and first-aid teamwork since the passing by Congress in 1910 of a bill authorizing the Bureau of Mines and outling its duties. Mr. Ryan declared that first-aid contests were undoubtedly an important part of accident prevention work.

Following the afternoon's session a banquet was held at which **Maj. F. C. Lynch,** director, Kansas City Safety Council, presided as toastmaster, and **Vincent Wakefield,** treasurer of the City Ice Co., Kansas City, delivered the chief address. Music was furnished by the Missouri Portland Cement Co.'s "Red Ringers" and the "Three Harmonie Lassies."

Investigation of Accidents

By J. M. Stolle

Superintendent, Bag and Packing Dept., Universal Atlas Cement Co., Hannibal, Mo.

INVESTIGATION of an accident should be conducted not as a matter of form nor merely for general information, but primarily to get down to the basic facts of the particular occurrence. If such an idea is kept in mind, the safety director, as a rule, will be in a position to correct the situation from information which the investigation brings out. He can then take steps to prevent the recurrence of a similar accident.

A carefully conducted investigation will show the safety director the general attitude of the employes and their supervisors towards accident prevention work and the established safety rules. There are accidents which safety rules do not cover and when these cases are examined, such orders or bulletins as are necessary to prevent a similar accident can be formulated.

When a fatal accident or one resulting in serious injury and loss of time occurs, we are inclined to treat it with all seriousness and immediately get busy to find out what it is all about; but we are likely to be less serious and place less importance on the so-called minor accidents.

Since an accident is an event that takes place without foresight or expectation, the difference is only in the degree of injury resulting from the accident. Accidents themselves should be considered of equal importance and the investigation conducted on this presumption. There may be some difference of opinion as to what class of accidents should be investigated, with the feeling, perhaps, that accidents resulting in slight injury are negligible and their investigation is only a waste of time. Personally, I would advocate checking up on all accidents. The results are worth it.

Note—This paper was read at the St. Louis safety meeting, February 24.

Accidents Are Caused

We are all agreed that accidents do not merely happen, but are caused, and when the cause is found, the cure is much more easily effected. There are many reasons why accidents should be investigated and analyzed. To my mind there are two which we should always be conscious of. One is to eliminate from the records and pass the responsibility for illegitimate or faked accidents. By this we mean an accident that in reality does not exist but is claimed, or one that has happened, but for which the company has no responsibility.

Beware of self-evident causes. You cannot assume that a man bruised his hand in the regular performance of his work just because he was using a hammer and a chisel. For instance, a man reports for work in the usual way, takes his regular job, and in an hour or so calls the foreman's attention to a swollen hand, saying he bruised it on a truck handle. This was on Monday morning. Although it was necessary to take the investigation away from the plant, it brought out the fact that the man had been doing some automobile repair work at home the previous Saturday afternoon which required considerable cranking, and this was the cause of the swollen hand.

With the importance given safety work today and the amount of pressure being brought to bear on the results, these "accidents" are becoming less frequent. There was a time, however, when this game was well played; and it is not beyond thought even now.

The other reason for investigating and analyzing every accident is to profit by the experience of the happening, thereby being placed in a better position to originate plans and promote and "sell" the safety idea in the plant.

Accident causes may be divided into three general groups, or classifications: Mental, physical, and material.

Mental causes may be referred to as attitude towards the job, the management or the surroundings; also worry, such as domestic troubles, sickness in the family, or financial difficulties. There is little outward evidence of an accident caused under such mental strain, and a frank admission on the part of the injured is the best evidence of his mental condition at the time of the accident. A man may hesitate to make such an admission; but the chances

are he has told some of his friends or fellow-workers of his troubles, and these men will be willing to assist the investigator if properly approached.

Physical causes, like mental causes, are often hidden hazards and unseen or even unknown to the man himself. However, some of the most likely or common of physical causes may be expressed as fitness for the job, fatigue, defective eyes and similar ailments. These two causes are different, yet may be closely associated. The services of someone acquainted with the medical profession would be of value in conducting the investigation and it is well to enlist the services of such a man where possible, particularly if there is any evidence of physical disability or cause to think so.

Material causes, such as bad practices, misused or poor tools, bad housekeeping, exposed hazards and the like are more simple, or at least easier to investigate, since the evidence and conditions surrounding the occurrence are likely to be outstanding and visible. This represents the majority of the causes, and they are, as a rule, more readily understood.

Who Shall Investigate?

The proper persons to make investigations depends upon the organization, and the way it is intended to function. Some organizations favor a special investigating committee with power to cover the whole plant; others prefer departmental committees, taking care of only such accidents as come under their jurisdiction. Individual investigations are also effective. At one time we left the investigation of certain accidents—those of a less serious nature—up to a committee composed of members of the particular division in which the accident happened. We found that it was a hard matter to get a report as full and complete as it should be and in many cases additional information and facts had to be obtained before closing the case. This really meant a second investigation. Another thing continually creeping into this method of investigation was the personal and sympathetic attitude likely to obscure the true state of affairs. In short, it was a matter of some concern to get a complete and impartial report.

We are inclined to favor joint investigation by the safety director and foreman, although frequently some other member or members of the organization are invited to take part. We believe, however, that an intelligent investigation can be made by anyone in authority, and, of course, the higher the official, the more effective and impressive will be the results.

The method of procedure should be governed by the accident, kind and class of labor, and local conditions. In instances where women are involved the situation is usually more delicate and more tact must be used to bring out a complete synopsis of the affair. However, investigation should be made immediately following the accident. A delay long enough to allow witnesses to exchange views and opinions will tend to influence or contaminate evidence and thus destroy the value of actual facts. No matter how honest or careful a man may try to be, the human tolerance is always present. Also, the method of procedure should be well planned, organized in a business-like manner and conducted on this basis.

Let Witness Express Himself

The investigator should first make those to be questioned feel free to discuss the case from all angles. Explain to them the reason for such an investigation and the benefits hoped to be gained. In other words, make the witness feel at ease and let him know he is free to express himself.

The attitude of the investigators must not be one of accusing, nor shall they assume the position that "someone will have to pay for such a careless performance as this," or that they will "get at the bottom of it if it is necessary to cross-examine every witness," etc. Their manner should be genial and their attitude one which will inspire confidence in them. By placing a witness in a co-operative mood and having him understand that he can be of help to the general cause, you will remove that antagonism which is sometimes found and the correct cause will be discovered. Do not allow the witness to imagine that you suspect he is trying to shield some one or conceal the real cause of the accident. This method of approaching an employe who possibly has just gone through the harrowing experience of seeing his fellow worker and friend of many years suddenly killed or badly injured is not worthy of being followed in a modern accident prevention investigation.

In many cases an investigation that starts out with a view to accident prevention is slowly converted to a legal or claims investigation. The two are opposite. The safety investigation seeks, by means of determining the exact cause of an accident, to evolve and issue rules or bulletins for preventing a similar accident in the future. The claim department seeks to determine the degree of responsibility of the company or the employes involved. Both are important, but should not be confused with each other.

One of the cement plant hazards

Too often when an accident has occurred, the amount of damage is stressed. While the damage is important, from an accident prevention standpoint the cause of the accident is of major importance.

The results of an investigation should be carefully studied by all concerned and other employes should be given the benefit of the finding. A good way to do this is to post on the bulletin boards the plant accidents, giving a brief but pointed report of the investigation.

The fact that men know an accident will be followed by an investigation has a moral and psychological effect that is otherwise lost. This is particularly impressive to new employes. There is no question but that an employe who has been a party to an investigation is a better safety man thereafter. This is proven in the case of a man who had an accident resulting in slight injury, although it could have been serious. By the time the investigation was completed, the man decided it was easier and more comfortable to be careful and safe than go through an investigation and openly admitted it. He was in no way embarrassed or uncomfortable during the questioning, and why he felt as he did will have to be answered by him; but he has not been hurt since.

Might Have Been Serious

It is impossible to enumerate things brought out in checking up on accidents. Sometimes they are quite complicated, at other times simple, and we wonder why the cause or conditions were not found before the accident happened. We had an experience with one of these cases some time ago. A workman, while getting some material from an overhead storage shelf, was working from a ladder and knocked a piece of casting from the shelf, striking another man on the head. Fortunately he received only a slight injury. Investigation brought out bad housekeeping; that several hazards were present; that part of the material so stored was of no value and should have been thrown in the scrap pile, and that in all probability the shelf was overloaded.

There are many such cases, so it is just as important for a safety organization to check up the accidents as it is for any good business man to check up on his business.

Frequently thought seeds are planted during an investigation which may not mature and produce fruit until some later date; but when they do, the results will be surprising. The report of a thorough investigation of a serious or near serious accident is a powerful ally to us in our accident prevention work if we will only take advantage of it as we should.

Victory Sand Co. Wins Right to Build Kansas River Plant

CONSTRUCTION WORK on a new $60,000 "classified" sand plant of the Victory Sand Co., to be located one mile above the city water intake, has been begun, it has been announced by Paul Sherman, president of the Victory company, Topeka, Kan.

Upon receiving permission from George S. Knapp, chief engineer of the division of water resources of Kansas, to return fine sand to the Kansas river a mile above the city water intake, the Victory company placed orders for additional equipment required for the new $60,000 plant. It will be placed on the "brick yard" location, three miles west of Topeka.

The new screening and washing plant will be equipped so that all classes of sand may be shipped immediately, Mr. Sherman said. The Victory now operates the largest plant in the vicinity of Topeka, according to the president, and when the new plant is completed will have the most modern plant in the Middle West.

The company already has more than a half mile of storage and loading tracks and additional tracks will be laid along the Kansas river west of the brick yard bridge. Construction on the new plant has been delayed pending issuance of the permit to Mr. Knapp.

The history of the delay and hearing on the proposition to locate a new plant above the water intake is given briefly by Mr. Sherman.

"At a hearing held by Mr. Knapp, March 23, the Victory company showed through its consulting hydraulic engineers that by actual test of the river at the brick yard bridge, absolutely no water was flowing through the south side of the bridge, and the 91.5% of the water was on the north half of the river.

"Surveys and accurate meter measurements were made of the entire river to determine area, depth, velocity and rate of discharge and expert testimony was submitted by one of the highest type and most efficient hydraulic engineers in the state.

"The testimony showed that first, the installation of a channel along the south bank of the river would be of great benefit to the water intake; second, that the fine sand returned to the river was between 0.0115 and 0.046 of one inch in size and was material which could be blown along by the wind or carried along in a current with a velocity of from 2/10 to 35/100 ft. per sec.; third, the hearing brought out that the permeable jetty above the bridge on the north side, which was apparently placed there to cause the river to flow in the south part of its channel, is not now effective and unless repaired or replaced all of the water may be diverted away from the intake to the north side of the river at any time."

In the matter of velocities which will carry the sand, the testimony brought out that a velocity of from 2/10 to 35/100 ft. per sec. would carry this fine sand, Mr. Sherman said, but the actual velocity of the river between the water intake and the brickyard bridge is much greater. The velocity of the river at the lowest stage last year between these points was 3 ft. per sec., the president stated, and at higher stages of the river there would be less danger because of the higher velocities accompanying them.—*Topeka* (Kan.) *Journal.*

Roy B. McHenry

ROY B. McHENRY, field engineer of the Medusa Portland Cement Co., Cleveland, Ohio, died March 15 of pneumonia. He was a Canadian by birth and in his 43rd year. He joined the Sandusky Cement Co., predecessor of the Medusa Portland Cement Co., in 1921.

Roy B. McHenry

James W. Van Benthusen

FUNERAL SERVICES for James W. Van Benthusen, for 11 years employment manager of the Universal Atlas Cement Co., a subsidiary of the United States Steel Corp., were held Friday, April 17, at his home in Chicago, Ill. His death occurred April 16. In addition to his regular position, Mr. Van Benthusen also was a director in the employes' welfare association of the cement company and interested in its group insurance plan and other activities. Prior to joining the company, he was chief rate clerk for the Pere Marquette railroad. He was active in community affairs. He was a native of Iowa and interment was at Marble Rock in that state.

James T. Foody

JAMES T. FOODY, vice-president of the Alfred Sand and Gravel Corp., Alfred, N. Y., died at his home in Hornell, N. Y., April 11. He was 49 years old.

Mr. Foody was a lawyer—a graduate of Cornell University. He was a member of the New York State Assembly. He had many business interests, among which was real estate. He was president of the North Hornell Realty Co., which was largely responsible for the development of the neighboring village of North Hornell from farm land which once occupied the site. He owns many pieces of property there as well as in this city now.

He was vice-president of the Babcock-Bath department store, one of the leading business enterprises in Bath village and the owner of a large business block in that village.

He was vice-president of the Alfred Sand and Gravel Corp., which developed large holdings at Alfred, and has one of the most complete sand and gravel excavating and washing plants in western New York.

He also had an active interest in a large modern dairy farm on the Canisteo road and had a multitude of other interests.—*Hornell* (N. Y.) *Tribune-Times.*

U. S. G. Canadian Subsidiary Buys Lime Plant

ACQUISITION of plant, property and business of the Standard White Lime Co. is announced by the Canadian Gypsum Co., Ltd. The lime company, operating a plant at Guelph, is one of the oldest organizations of its kind in the Dominion. Business will be continued under the same management, with D. E. Kennedy in charge of sales at Guelph.

The acquisition of this property by Canadian Gypsum, in conjunction with the plant of the Albert Manufacturing Co. at Hillsboro, N. B., purchased in September, 1930, and the proposed gypsum plant in Ontario, gives Canadian Gypsum distribution of a full line of gypsum plaster, boards, specialties and lime products in eastern Canada.

Under New Ownership

THE Concrete Aggregates Corp., of which Charles O. Hutchins of Wilkes-Barre, Penn., is secretary-treasurer and general manager, has taken over the plant of the Wyoming Sand and Gravel Co. at Lanesboro. This plant was originally known as the Lanesboro Sand and Gravel Co.

John H. Hutchins, superintendent of the company, is now at work with a number of men, putting the plant in running order.

Charles O. Hutchins, head of the concern, has had wide experience in the sand and gravel business, as has his cousin who will direct the operation of the plant.—*Susquehanna* (Penn.) *Transcript.*

Ed. Shaw's News Letter From Los Angeles

NOBODY LOVES A ROCK CRUSHER. At least I got that impression at a hearing on a proposition to establish a new one. It was before the planning committee of the Los Angeles City Council. First there were a few proposals to put in filling stations, to which no one objected very seriously. Then a proposal to put in a dog kennel, and only one person appeared to protest that. But when the chairman said rock crusher almost the whole roomful of people went forward and asked to have their protests heard.

There were two hearings. The proposal most objected to had a site in Sunland, which is a part of the city with some self-government. It is a very pretty place on the edge of the Big Tujunga wash and famous for its park filled with century-old live oaks. There are five crushers near it now. And I must explain that what is called a sand and gravel plant everywhere else is called a rock crusher here, probably because the most valued part of its product comes from crushing boulders.

Basis of Objections to New Crusher

Of course I was most interested to know if the new plant would be objected to on the ground that it was not needed, since all of the plants in that locality are down at least part of the time. This point was raised but the chairman refused to consider it. He wanted to know only how the proposed plant would adversely affect the health, morals and convenience of the public.

The protestants had their answers ready. Sunland gets a large part of its water supply from wells in the wash. It was claimed that whenever rock crushers were put in, the wells they drilled for wash water depleted a supply that was already rather scanty. The objection on the ground of safety was that the pit would be put in the wash where it would endanger a bridge and a public highway. In the rainy season these dry washes sometimes become roaring rivers and it has happened that a pit below a bridge has caused a suction that has taken out the bridge foundations. And there was the usual objection on the score of noise and dust. One man said that when he tried to sell a lot or borrow money for building the customer, or loaner, took one look and then said "Oh, Oh! Rock crusher, eh?" and then he departed and was seen no more in that locality.

The Applicant's Argument

The applicant started out well with his argument. He showed that there would be no serious change in conditions as they now existed and that his pit would not endanger any bridge or highway. Furthermore, he proposed to put in a dustless and noiseless plant that would interfere with no one's comfort. Cries of derision arose when he said this, but the chairman called for order and said it was quite possible to have rock and sand plants so nearly noiseless and dustless that no reasonable person would find one objectionable at the distance of the nearest dwelling from the proposed plant.

Beautifying Industry

It pleased me very much to hear him say this, for it is one of my pet convictions that our modern industrial civilization can succeed only by overcoming the objection that people have to living near industrial plants. Here, as elsewhere, great progress is being made in that way, and since so many of the plants here are new one sees more of it The best example I have noted is a metallurgical plant (with electric furnaces of course) that is housed in a really beautiful building that stands in grounds like a park. Of course rock and sand plants can hardly come up to that standard yet, but there is one which is housed in a fine concrete building on the edge of a public park, and it is not offensive and does not look out of place there.

Rock Crusher Apparently a Last Resort

But the applicant rather hurt his case in my opinion by saying that he wanted to start a rock crusher because he had been unable to sell the land for building lots or to make a sportsman's camp of it. If I judge public feeling right the day for such an argument is past. The single matter that should be considered is the necessity and convenience to the public of a new enterprise. It simply *cannot* be a good thing to go on building plants just to have them rot down after a few months' operation. Even the men who have machinery and trucks to sell must see that it is short sighted policy to add to the stocks of their worst competitor, especially in hard times, the second-hand machinery man.

An Ecclesiastical Setting

The hearing was held in the council chamber of Los Angeles' magnificent city hall. It looks like a great church interior with its Byzantine arches, its high roof and tall windows. There are even wide church pews for seats. But surely no church, unless it was in decadent Byzantium, was ever so bedizened with variegated marble columns, onyx window sills and gilded murals. I felt reverent when I entered and wished I had a prayer book. But in the space before the altar—or rather the mayor's desk—where one expected to see priests and acolytes—were two thick-necked gentlemen of the politician type, who had forgotten to remove their hats, and three pert little stenographers.

You may wonder where this ties into the rock products industry, but I think it does. It looks as though we were not going to build any more such buildings. A prominent Los Angeles architect just back from a long tour in Europe says he found nothing but modern and modernistic buildings going up over there. "The function of the building determines its form," he said, "and they are doing no more copying of old buildings." And we know the same movement is growing very fast in the United States.

Concrete Has a Future

The most used materials for the newer types of buildings are steel, glass and concrete, and the greatest of these is concrete. You can find some surprising things that are being done in concrete if you look through the art and architectural magazines. *Creative Art* for March shows rows of concrete workingmen's homes built in Holland for 213 pounds sterling, which is just about $1000. The contrast between the old and the new forms is very sharp.

Whenever the imagination of the public is seized by a new style of building a lot of new construction follows. The craze for building skyscrapers (which I am told do not pay as well as lower structures) is a case in point. If modernism gets hold of us as it has some of the Europeans it may furnish the impetus that is needed to induce the owners of old, outmoded buildings to replace them with new ones.

As to the Application for a Rock Crusher—

The committee passed the buck on both applications to install rock crushers. They are to be argued before the full council at a later date.

Concrete Brick Company for South Sioux City, Neb.

NEGOTIATIONS are under way for the forming of a stock company to put in a concrete brick plant in South Sioux City, Neb.

This company will use a recent improvement in making cement brick, which it is claimed is far superior to the clay brick and being on the same plan as the concrete blocks, only of brick shape and can be sold for less than clay brick.

The parties interested are negotiating for the old distillery property, which would be an ideal location.—*South Sioux City* (Neb.) *Eagle.*

Foreign Abstracts and Patent Review

Proposed German Specifications for Aggregates. The following data are in substance the report of the third meeting of the working committee for the standardization of granular sizes of aggregates, which was held at Berlin on October 31, 1930. During the years 1905 to 1910 Bredtschneider had made efforts to determine the most favorable granulation of aggregates. This work was interrupted by the World war until April 4, 1921, when the first meeting of representatives of the German sand and gravel industry was held under direction of Cramer; but little attention was paid to the work of this German committee on aggregate specifications. The second meeting did not occur until March 23, 1927, and was held by request of road construction industries. At this meeting two subcommittees were formed for the purpose of specifying designations for granulations of sand (aggregate to 2 mm. size) and for granulations of gravel, crushed stone and other coarse aggregates. Subcommittee 1 met on January 19, 1928, and Subcommittee 2 on April 7, 1927 and November 22, 1927. The results of these meetings were presented before a meeting of the general committee on March 9, 1928, for consideration and the decisions published on April 6, 1928, as Proposed Specifications.

At the third meeting, on October 31, 1930, the second set of Proposed Specifications were passed upon. These specifications were considered applicable to the building industry. It was suggested that an attempt should be made to make the granulation specifications as comprehensive as possible and that this purpose could be attained earliest if the screens were standardized and not the granulations. It was recommended that for example the granulation 40/30 should designate a material which passes through a screen opening of 40 mm. diameter and remains on the screen of 30 mm. diameter perforation. It was then decided to designate the granular sizes by the diameter of the screen perforations or the mesh widths and to speak of granulations instead of granular sizes. It was decided further that round numbers be used and that the limit between the square mesh screen and the round perforation screen be set at 1 mm. No absolute uniformity has been arrived at in the terminology of the various aggregates for the various industries using aggregates. The proposed specifications are as follows:

Granulations to 1 mm. size are determined by mesh screen and granulations of 1 mm. or more by round perforation screens. The granulation itself is designated by the mesh width or perforation diameter of the screens in millimeters (1 mm. is 0.03937 in.). A granulation of 30 to 40 for example, is a screened material which remains on the 30 mm. diameter screen and passes through the 40 mm. diameter screen.

Designation of aggregate	Granulation of aggregate Residue on screen Mesh width or perforation, in mm.	Throughs on screen
Natural Aggregates		
Sand		
Dust	.....	0.06
Flour	0.06	0.088
Fine sand	0.088	0.2
Medium sand I	0.2	0.6
Medium sand II	0.6	1
Coarse sand	1	3
Gravel		
Fine gravel	3	7
Medium gravel I	7	10
Medium gravel II	10	15
Coarse gravel	15	30
Macadam gravel	30	40
	40	50
	50	60
	60	70
Fine gravel sand	0	7
Medium gravel sand	0	15
Gravel sand	0	30
Macadam gravel sand	0	70
***Artificial Aggregates (Sized)**		
Flour		
Flour I	.....	0.06
Flour II	0.06	0.888
Flour III	0.088	0.2
Crushed sand		
Fine sand	0.2	0.6
Medium sand	0.6	1
Coarse sand	1	3
Graveled stone		
Fine graveled stone	3	7
Medium graveled stone	7	10
Coarse graveled stone	10	15
Crushed stone		
Fine crushed stone	15	20
Coarse crushed stone	20	30
Crushed macadam		
Fine macadam	30	40
Medium macadam	40	50
Coarse madacam I	50	60
Coarse macadam II	60	70
Overflow	70	....
Natural Aggregates for Concrete		
Concrete sand		
Concrete fine sand	....	1
Concrete coarse sand	1	7
Concrete gravel		
Concrete fine gravel	7	30
Concrete coarse gravel	30	70
Concrete gravel sand	....	70
Artificial (Sized) Aggregates for Concrete		
Concrete crushed sand		
Concrete fine sand	....	1
Concrete coarse sand	1	7
Crushed stone for concrete	7	30
Macadam stone for concrete	30	70
Artificial Ballast for Railways		
Crushed railway aggregate I	10	20
Crushed railway aggregate II	20	30
Crushed macadam (crushed stone)	30	60

*The designations are to be used in connection with aggregates of rock, clinker, slag, etc.

—*Tonindustrie-Zeitung* (1931) **55**, 2, pp. 21-22.

Significance of Clay for Lime Fixation in Raw Cement Flour. K. Spangenberg first reviews the conclusions relative to researches on alit as reached by Bates, Klein, Phillips, Kuehl, Jaenecke, Dyckerhoff, and in particular Guttmann and Gille. It appears to Spangenberg that the problem as to how far the ultimate results of technical clinker burning can be conditioned either by the nature of the reaction, or by the nature of the ultimate material, or by both, requires a special explanation, at least before announcement of X-rayographic and chemical results given by A. Guttmann and F. Gille; for it is known from examination of the burning process of pure kaolin that the product arising after release of water from the crystallized kaolin ($Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$) behaves differently than an ordinary mixture of the two anhydrous oxides. It appears possible to him that at least the beginning and the course, and perhaps the ultimate product also, of a reaction can be quite different, depending on whether dehydrated kaolin or the ordinary mixture of $Al_2O_3 + 2SiO_2$ with CaO is brought together.

He discusses reasons for a close relation between the reaction of lime and kaolin, and the reaction in the raw cement flour. All clays used as initial material for portland cement manufacture contain, besides more or less abundant elastic residues primarily the "clay substance," the quantity of which is determined technically by aid of the so-called "rational analysis," and consists of portion *A* of changeable composition of the proportion $SiO_2 : Al_2O_3 > < 2:1$ soluble in hydrochloric acid, and of portion *B*, which is crystallized mineral kaolin and soluble in hot concentrated sulphuric acid. The author plans an examination of the reactions of $Al_2O_3 \cdot 3H_2O$ with $CaCO_3$ (or CaO). The mechanics of the reactions are discussed.

These reactions are greatly accelerated by the influence of gases, especially H_2O vapor, the influence of which may be expected also in the reaction of kaolin with lime, if it starts at temperatures at which the former still contains H_2O. It has been observed that in calcining alkaline earth carbonates with Al_2O_3 and also with kaolin, the dissociation temperature is lowered about 200 deg. C., due to the action of the special nature of the Al_2O_3 in the metakaolin, according to Tamman and Pape. In order to test the correctness of the conceptions of the role of the kaolin in the raw cement flour at the begininng and in the course of lime fixation, as advanced by the author and as obtained from the review of the work of others, the author urged I. Weyer in 1927 to prepare a thesis on the subject, from which artieles are to be published.—*Zement* (1931) **20**, 5, pp. 94-96.

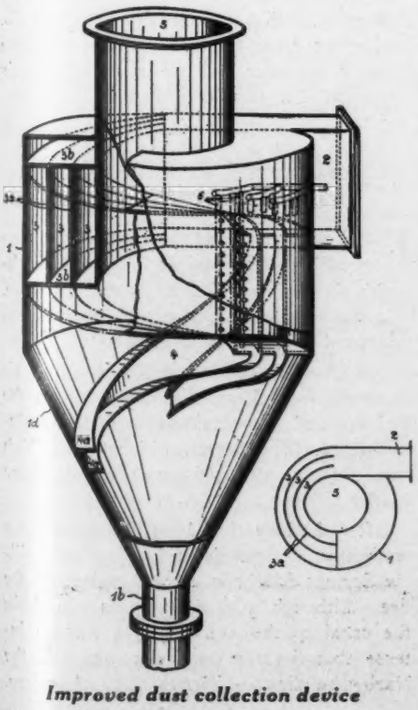
Magnesia Refractories Manufacture. F. Reinhart reviews the following patents relative to magnesia production and the manufacture of magnesia stone: German patents 412,397, 421,428, 432,105, 460,418, 484,554

and 486,856; Austrian patents 96,905, 104,404, 109,012, and American patents 1,444,527 and 1,690,771. In view of the suggestions made in these patents, the following viewpoints should be observed in the manufacture of good magnesia stone: Such a magnesia appears suitable as raw material, as consists primarily of small periclase crystals and which has a magnesium oxide content of about 95%, and also about 5% content of impurities comprising compounds of calcium, iron and silicic acid. The raw material is pulverized in various granular sizes which give a minimum of hollow space within the mixture. The binding agents may consist of finest ground portions of the raw material, if necessary with additions of organic binding and adhesive agents such as drying oils, molasses, syrups, etc. After some moistening and intimate mixing, the material is formed under a pressure of 500 to 1000 kg. per sq. cm., dried and burned at temperatures above 1500 deg. C., so that the impurities present are fixed as high refractory compounds as, for example, magnesium orthosilicate, magnesia ferrite, etc.—*Tonindustrie-Zeitung* (1931) **55**, 7, pp. 94-97.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Commissioner of Patents, Washington, D. C., for each patent desired.

Dust Collection. The inventor of the device illustrated says that it may be used for either wet or dry collection of dusts, but it appears that the wet method is preferred by him from the detail with which it is described. The gases holding the dust enter through a tangential inlet and pass through parallel helical passages leading downward into the cone of the separator.



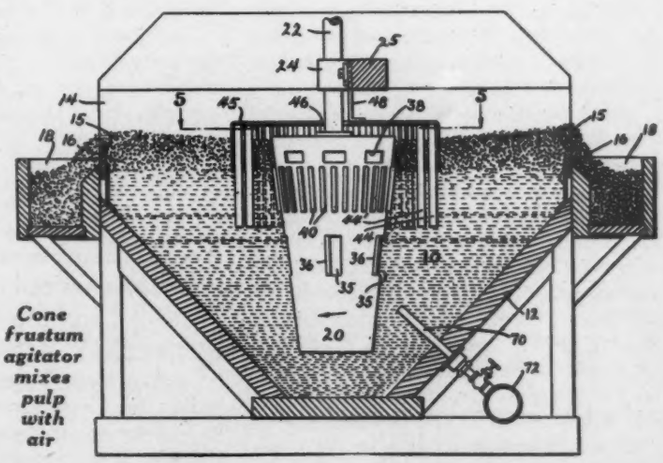
Improved dust collection device

The passages are less deep as the end is approached, which increases the velocity.

The inventor claims that the parallel passages have a greater effect in catching dust than a single passage would. The particles have only to travel a short distance before striking the wall. With the wet method there are sprays in each passage which make a mist that helps to catch the dust. The water strikes on the walls where the dust collects and washes it down. An improvement claimed is that of placing the sprays in the parallel passages instead of at the entrance to the collector. This avoids destructive corrosion in other parts of the apparatus.—*A. Stievenart, U. S. Patent No.* 1,754,126.

Treating Siliceous Materials. The patentee describes a method of treating siliceous minerals containing potassium, aluminum and ferric iron in combined form which consists in treating the mineral with sulphuric acid, converting the ingredients into sulphates in solution, separating the solution from the residue, crystallizing out a part of the potassium and aluminum sulphates as potash-alum, separating the crystals from the mother liquor and precipitating the ferric sulphate and the remainder of the potassium and aluminum sulphates in strong sulphuric acid.—*Arthur J. Moxham, assignor to the Electro Co., U. S. Patent No.* 1,748,989.

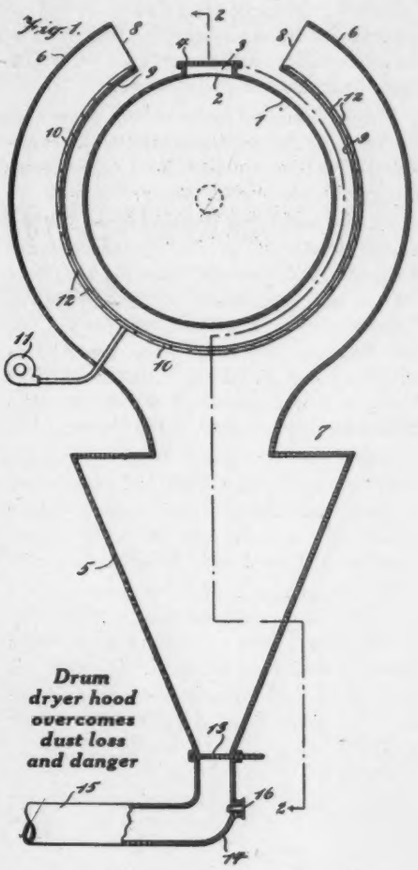
Flotation Method. Since flotation is used in several branches of the rock products industry, a simple method of frothing has its interest. The agitator that mixes the pulp with air is a cone frustum open at the bottom but closed at the top except for an opening for admitting air. Flanges like screw threads are placed on the inside of the cone to force the material upwardly. The mixture of pulp and air is discharged mainly through vertical slots in the side of the cone, but some of it flows through horizontal slots above these. A ring of vertical baffles surrounds the agitator and these arrest the discharge of the froth and entrain more air.



Cone frustum agitator mixes pulp with air

In operation the pulp is passed through a series of cells each of which contains one of the agitators shown. The flow passes from one cell to another through slots which do not show in the cut. The froth overflows into troughs on both sides of the line of cells.—*Robert Lord, U. S. Patent No.* 1,761,136.

Hood for Drum Dryer. When dryers of the closed drum type are emptied there is a considerable loss of dust, besides danger to the workmen who have to breathe the dusty air. The invention shown prevents this by placing a hood around the dryer. This is connected to a suction fan that draws out the dust from the space between the hood



Drum dryer hood overcomes dust loss and danger

and the dryer. The hood is above a receptacle into which the dried material falls. At the lower end is a pipe and a nozzle for an air jet which carries the discharged material to any place desired.

When the drum is to be emptied the cover is removed and a short cylinder substituted. This projects into the hood between flanges which make a working fit.—*W. P. Marseilles, U. S. Patent No.* 1,774,757.

Kentucky Ladies Would Save Their Hills and Close Down Quarries

THE FIGHT for the preservation of the hills encircling Frankfort, Ky., from the inroads of privately and municipally owned quarries gained recognition recently when it was announced that seven civic organizations had indorsed the movement.

The Frankfort Garden Club, pioneer in the conservation fight, has adopted a resolution asking the city council to cease operation of the city-owned quarry.

Joining with the Garden Club are the United Daughters of the Confederacy, the Frankfort and Susanna Hart Shelby Chapter of the Daughters of the American Revolution, the Frankfort Woman's Club, the Younger Woman's Club, the Altrusa Club and the Frankfort Chapter of War Mothers, it was announced recently by Miss Lillian Lindsey, member of the Garden Club.

Should the city council approve the resolution of the Garden Club and cease work on the municipally-owned quarry, there would still remain two privately owned quarries to contend with, Miss Lindsey said.

The abandonment of the quarries would not bring about a shortage of building stone in Franklin county according to Willard Rouse Jillson, state geologist, since there is an abundance of stone in the county exclusive of the Frankfort quarries, Dr. Jillson said.

Miss Lindsey, together with Julian Oberworth, local architect, appeared before the War Mothers in the interest of the conservation movement.

Recently, Miss Lindsey, with Mrs. John F. Lewis, representing the Daughters of the American Revolution, appeared before the Woman's Auxiliary, American Legion, and asked for co-operation in the saving of the hills. Miss Lindsey, speaking before the Legion Auxiliary, compared the "tangible assets" accruing to the quarry owners to the "intangible assets" to the community from the preservation of the hills as a scenic attraction.

Mrs. Lewis emphasized the conservation of the hills because of historic associations. She remembered that in her youth the forces of Gen. Braxton Bragg, Confederate leader, engaged in a cannonade with federal militiamen across the city.—*Louisville* (Ky.) *Courier-Journal.*

To Develop New Limestone Deposit in Idaho

A RARE DEPOSIT of travertine limestone located in the Ketchum country estimated at 8,000,000 tons, is to be developed immediately for the use and benefit of Idaho and intermountain farmers to fertilize their land. The American Travertine Lime Co., capital stock $100,000, has just filed articles of incorporation with the secretary of state. The incorporators are V. P. Coffin, Mrs. V. P. Coffin and T. J. Jones.

Travertine limestone will place back in the soil that which crops have removed from the soil, it is said. This limestone in a natural state is not common. The Ketchum deposit is said to be one of the few in the country. It furnishes a cheap but a very valuable fertilizer.

The American Travertine Limestone Co. expects to give Idaho a new industry by developing this deposit, passing it through a fine grinding mill and selling it at a low price to the farmers of Idaho and the west. —*Boise* (Ida.) *News.*

Los Angeles Harbor Improvement Brings Re-Opening of Catalina Quarry

LOCAL HARBOR CONSTRUCTION work between now and the end of this year will take 80,000 tons of Catalina Island quarry rock, Harbor Engineer George F. Nicholson, of Los Angeles, Calif., has announced. The rock will be quarried, transported and placed in harbor jetty and protection walls at an approximate cost of $240,000 to the city.

For many years the city harbor department has had a quarry lease from the Santa Catalina Island Co., owned by William Wrigley, Jr. The quarry is located near the isthmus 11 miles from the city of Avalon. Raymond D. Brown of Los Angeles is the quarry foreman, and has 20 local men working under him. Eleven other men are employed in the harbor rock handling force in Wilmington and San Pedro.

All rock work is under the direct supervision of D. R. Coover, the harbor department superintendent of construction. The quarry has just been re-opened after being shut down for more than a year.

The island rock is being delivered in the harbor with two big city-owned barges, towed by a city tug boat. When in full operation, the quarry sends 700 tons of rock each day across the 25-mile channel to Wilmington and San Pedro.—*Wilmington* (Calif.) *Press.*

Local Chamber of Commerce in Mississippi Trying to Promote Quarry

SECRETARY RUBLE of the West Point, Miss., Chamber of Commerce, had as his guests several people interested in highway construction and building material who after visiting a number of localities obtained samples of different limestone rock for laboratory purposes.

Following analysis, the visitors expressed a purpose of returning to West Point for further investigation. If the rock proves satisfactory Secretary Ruble hopes to secure a crushed rock plant for West Point.—*Meridian* (Miss.) *Star.*

St. Charles Lime and Quarry Co. to Be Operated by a Receiver

IN ORDER to secure the Central Trust Co. and other creditors the St. Charles Lime and Quarry Co., St. Charles, Mo., has been placed in the hands of a receiver who will apply the proceeds of operation and other assets to pay off outstanding accounts. For some years the quarry company has supplied crushed rock for road work to the city and county of St. Charles, and agricultural limestone to farmers in this vicinity. The extent of operations is shown by the fact that the annual payroll exceeded $50,000. However, in seeking to increase the output and to supply rip-rap rock for river work, expensive investments were made in preparation, and thereby indebting the quarry company to the Central Trust Co. and a few minor creditors. After a delay of nearly three years river work has finally come within reach of the quarry at Weldon Springs, and a number of satisfactory contracts have been obtained for this year's work, with the possibilities of getting others.

A petition asking for a receiver was presented to Circuit Judge Edgar B. Woolfolk of Troy, recently, and after presenting proof of the advisability of continuing operations, was granted. The petition names the Central Trust Co. and the Illinois Powder Co. as plaintiffs and the St. Charles Lime and Quarry Co. and its directors as defendants.

Harry H. Hopkins, of St. Louis, president of the H. H. Hopkins Contracting Co., has been named receiver, and it is expected that he will take charge very shortly. This will introduce new management under the direction of one who is familiar with quarrying, and assure the Central Trust Co. and other creditors that the assets of the Quarry company will be applied to their accounts.—*St. Charles* (Mo.) *News.*

Consumers Co., Chicago, Ill., Loses Stone Plant by Fire

FIRE early April 14 destroyed the stone-crushing plant, machine shop and blacksmith shop of the Consumers Co., Chicago, Ill., quarry east of Lemont, Ill., with a loss estimated by officials at $250,000.

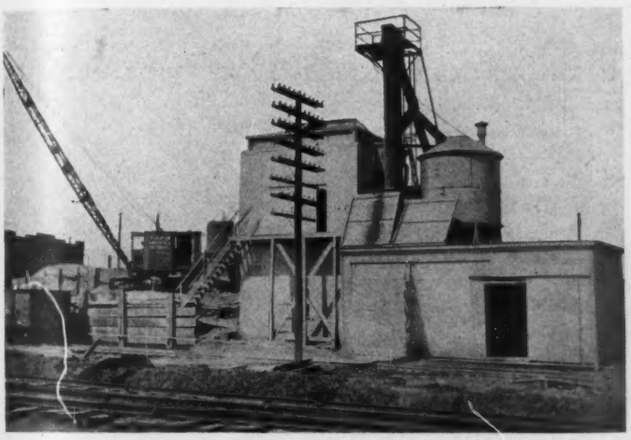
The plant is situated at the top of a pit one mile from Lemont and is between the Chicago and Alton railroad and the Drainage canal. The flames, which leaped high into the air, attracted large crowds from nearby villages.

After the blaze had been discovered by a watchman, firemen from Lemont and Willow Springs fought in vain to extinguish the fire. Although a hose line was run from the canal to the fire, the heat was so intense that firemen could not approach the blazing buildings.—*Chicago* (Ill.) *American.*

Cement Products

Pre-Mixed Concrete in Dallas-Fort Worth District

Producers Are Active in Marketing Aggregates in the Form of Ready-Mixed Concrete



Two views of plant of Tucker Concrete and Material Co., Ft. Worth, Tex.

IN ORDER TO PROTECT their retail sand and gravel trade increasing numbers of producers of aggregates in various parts of the country have gone into the manufacture of ready-mixed concrete.

This is true of the Dallas-Fort Worth, Tex., section in northern Texas, where both of these cities, some thirty miles apart, are served by concrete manufacturing plants affiliated with and controlled by the producers of aggregates.

At Dallas the Penniman Concrete and Material Co., and at Fort Worth the Tucker Concrete and Material Co. are both affiliated with Gifford-Hill and Co., Inc., large producers of sand and gravel.

Also at Dallas, the Dallas Transportation Co. manufactures concrete, using aggregates furnished by the Dallas Washed Sand and Gravel Co., with which it is affiliated.

At Fort Worth the Fort Worth Sand and Gravel Co. likewise operates a ready-mixed plant, using materials from its own sand and gravel plant just east of the city.

Both operations of the Gifford-Hill companies are conned to the use of transit-mix trucks, loaded with dry materials to which water is added later.

The Dallas Transportation Co. is at present using the same method, but has a new plant under construction which will allow the trucks to be loaded with either pre-mixed concrete or dry batched materials.

The new plant of the Fort Worth Sand and Gravel Co. will also permit the trucks to be loaded with pre-mixed concrete or dry batched materials.

All four companies make deliveries of sand and gravel as well as concrete.

Tucker Concrete and Material Co.

The plant of the Tucker Concrete and Material Co. at Fort Worth, which was put into operation in June, 1930, and is the most recent of those now operating in this section, is typical of the transit-mixed system in which the truck receives the dry batched materials and to which the water is added later.

It is located at 2600 Pine Street about one mile southeast of the downtown district and is served by a railroad siding from the line of the Texas and Pacific railway.

The sand and gravel are shipped by rail from the Gifford-Hill plant at Hart, a short distance east of the city, and the cars are unloaded by crane and clamshell bucket.

A P. & H. gasoline crawler type crane with a ¾-yd. bucket is normally used for stock piling and loading out aggregates in the yard, while a No. 1035 Bucyrus-Erie gasoline caterpillar type crane with a 1-yd. Type K Owens bucket is used at the transit-mix plant to stockpile and to keep the batching bins filled.

A Blaw-Knox 4-compartment steel bin of 115 tons capacity in connection with a 4-lever beam scale with indicating dial is used for batching into the truck, charging the hopper below. Double-quadrant gates, each operated by a lever, are used on both the bin and hopper outlets.

Cement is handled in bulk from the railroad car to either of two steel storage bins by means of a Link-Belt, steel-cased bucket elevator and spouts, and is then drawn from either bin and put up into a small hopper above the batching platform by the same elevator, all of which is controlled by the

Office and plant of Tucker Concrete and Material Co., Ft. Worth, Tex., and one of the transit mixers

batching operator through a system of three spouts and gates.

From this hopper the cement is drawn into a weighing hopper equipped with a beam scale and indicating dial, and is then admitted along with the aggregates to the small truck charging hopper below.

Water is measured into a charging tank by means of a lever type valve and indicating dial scale showing gallons, and then emptied into the tank on the truck.

Five 2½-yd. and two 2-yd. "Transit-Mixers" are used, all mounted on White trucks. Three White trucks with 2-yd. plain dump bodies are also used in the delivery of sand and gravel.

The plant has a capacity up to about 500 cu. yd. of concrete per day or an average of about 40 cu. yd. per hour.

One of the large jobs on which concrete has been furnished from this plant is the new 8-story Texas and Pacific railway freight terminal involving about 27,000 yd. of concrete.

Zoning has not been resorted to, the concrete being sold at practically the same price anywhere within the city limits. Frequent tests are made on both the sand and gravel to determine the moisture content and gradation and thus maintain a uniform concrete.

Penniman Concrete and Material Co.

In Dallas the Penniman Concrete and Material Co. has a somewhat similar plant at 3000 Junius Street, from which concrete is delivered in nine 2½-yd. Transit-Mixers. This plant is also on the Texas and Pacific.

The sand and gravel from the Gifford-Hill plant at Grand Prairie, a short distance west of the city, is unloaded from cars to piles by a Lorain No. 55 crawler type gasoline-engine-driven crane with clamshell bucket, which also keeps filled a concrete hopper feeding the concrete plant. From the hopper the material is carried to the top of the bins by a belt conveyor. Butler bins and weighing batchers are used, with beam scales and indicating dials.

Cement is handled in bags, which are emptied to a bucket elevator carrying up to a hopper from which it is weighed in the same manner as the aggregates in a separate weighing hopper.

A water tank with an adjustable overflow and a gage glass is used to charge the tank on the truck with the correct amount of water.

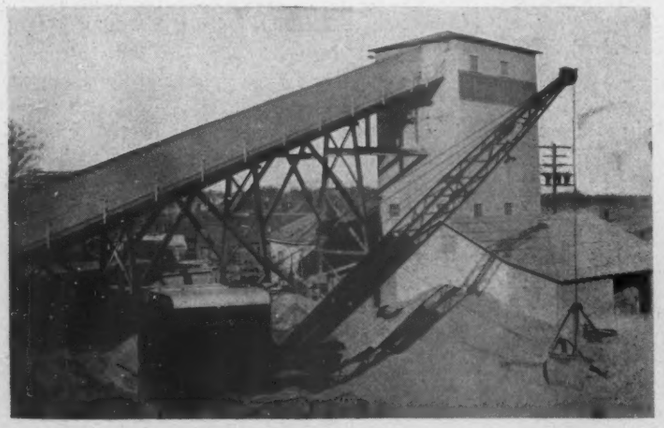
Another more or less temporary plant has been erected by this company a short distance west of the city for furnishing concrete for the Mountain Creek dam, which is being constructed for the Texas Power and Light Co. Materials for this plant are trucked from the Grand Prairie plant of Gifford-Hill and Co. It is similar to the other plant, using a hopper and belt conveyor to carry materials up to the bins.

Gifford-Hill and Co. Gravel Plant at Grand Prairie

Gifford-Hill and Co. operate a number of sand and gravel plants in Texas and Louisiana, but the above concrete plants and retail yards are normally supplied from the nearby plants at Grand Prairie and Hart, Tex., both of which are operated in a similar manner.

At Grand Prairie the deposit runs to fine gravel and sand, with little oversize. At the present time about 16 ft. of overburden is removed to obtain about the same amount of sand and gravel. This stripping is put back into the excavated area, a 3-yd. walking Monighan dragline excavator being used for the stripping and a 2-yd. excavator for the gravel. This is loaded to 12-yd. Western side-dump cars and hauled to the plant by heavy standard gage steam locomotives, where it is dumped to a sump and pumped to gravity screens by a 10-in. Amsco pump, belt-driven by a 20-hp. Allis-Chalmers motor.

The screens remove most of the sand to



Batching plant of Penniman Concrete and Material Co., Dallas, Tex.

Penniman plant, built for Mountain Creek dam job, near Dallas

Preliminary washing and ballast loading plant of Gifford-Hill and Co., Grand Prairie, Tex.

two Link-Belt drag conveyor dewatering boxes, which discharge the sand direct to railroad cars, and the gravel is loaded either directly to railroad cars as ballast or goes to a hopper from which it is carried to the washing and screening plant on an inclined belt conveyor.

This is a 30-in. conveyor which discharges to two parallel rows of four Link-Belt conical revolving screens in series, followed by a Link-Belt drag conveyor classifier for dewatering the sand.

The gravel and sand falls to storage piles below, which are partitioned off to keep each size separate, and the material is then drawn from the bottom of this pile on to a belt conveyor in a tunnel below and carried up and over to the loading point. Here it is rinsed again in a revolving screen and over a gravity screen in the loading spout as it falls to the railroad car or truck. A 6-in. Dayton-Dowd centrifugal pump driven by a direct-connected 50-hp. General Electric motor furnishes water for washing.

Dallas Transportation Co.

At Dallas, the Dallas Transportation Co. operates a dry-batching plant at 817 Bourbon Street in connection with five 2½-yd. Jaeger "Dual-Mix" bodies on Liberty trucks for delivery. Heltzel bins and weighing hoppers are used for the gravel and sand and the cement is handled in bags.

This company is now building a new ready-mix plant adjoining its shop and new office building at the west end of the Commerce street bridge. This is in the new industrial section which is being made as the result of the changing and straightening of the course of the Trinity river and the filling in of the low land in that district.

This plant, it is understood, will be arranged for both dry batching and central mixing.

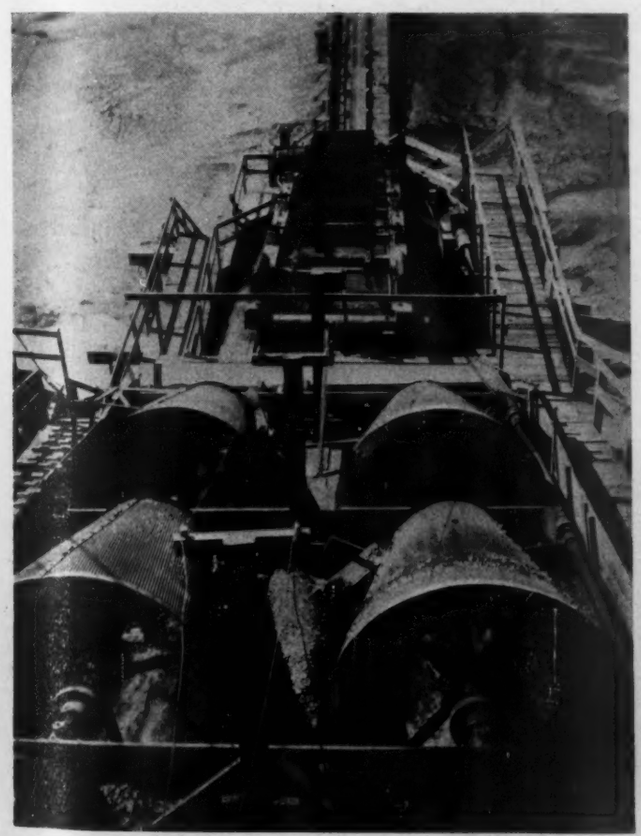
Dallas Washed and Screened Gravel Co.

The aggregates for the above concrete plant and retail yard of the Dallas Transportation Co., are furnished from the gravel plant of the Dallas Washed and Screened Gravel Co. a short distance west of the city.

Here one Monighan and one 3-yd. Bucyrus dragline excavator are used, putting about 7 ft. of stripping back in the worked-over area and excavating about 14 ft. of gravel. It is moved from the pit to the plant in two 20-yd. side-dump cars by a standard-gage steam locomotive and is dumped to a track hopper from which it is carried up to the screens on a 24-in. inclined belt conveyor.

A single row of four Link-Belt conical revolving screens is used, followed by sand-settling cones. One Deister (Leahy) and one Link-Belt vibrating screen are used for additional cleaning below the revolving screens.

The washed and sized material falls to bins below, which extend over two railroad



Screening and washing plant of Gifford-Hill and Co., Grand Prairie, Tex.

One of the trucks of Dallas Transportation Co., Dallas, Tex.

New concrete plant under construction by Dallas Transportation Co.

in operation April 20 at the time it was visited.*

The new plant will have an open storage pile partitioned off to keep the sizes separated and this storage will be kept filled by a locomotive crane and clamshell bucket from railway cars alongside. The aggregates will be shipped by rail from their gravel plant a short distance east of the city.

A belt conveyor in a reinforced concrete tunnel below the pile will carry the materials from storage to a second inclined conveyor which will deliver either to a 450-ton truck loading bin or to the bins over the concrete plant. This plant will be arranged for central mixing in two 2-yd. mixers, or for dry batching and mixing in transit.

Heltzel bins and Jaeger "Dual-Mix" trucks will be used, and for the present one 2-yd. Lakewood mixer along with one of the two 1-yd. Ransome mixers used in the old plant.

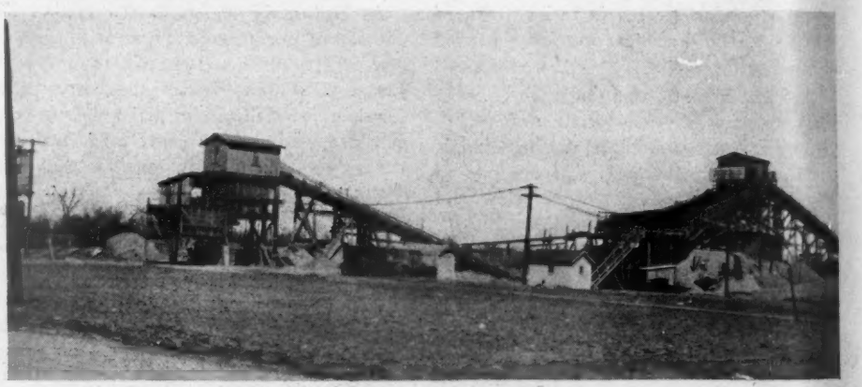
*Later reports confirm the opening of the plant at this time.—Editor.

loading tracks. These bins are of reinforced concrete construction up to and including the floor, with timber sides.

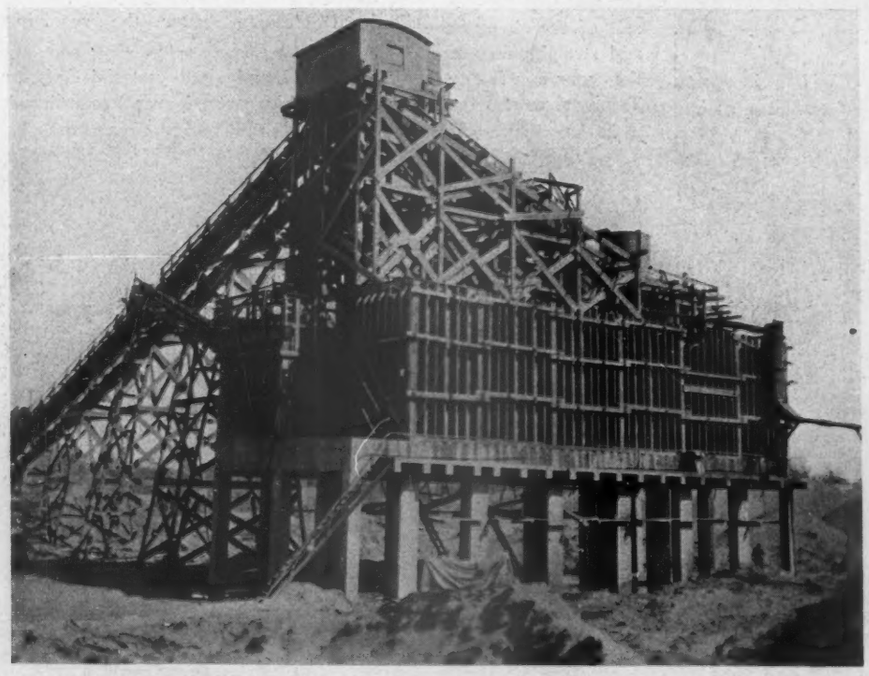
Fort Worth Sand and Gravel Co.

At Fort Worth, the Fort Worth Sand and Gravel Co. is building a new plant for the manufacture of concrete and truck loading of aggregates.

This is located just north of the Rock Island railroad at Seventh street, adjacent to the company's present concrete plant and a few blocks from the center of the downtown section. It was expected to have the plant



Washing and screening plant of Gifford-Hill and Co., Grand Prairie, Tex.



Sand and gravel plant of Dallas Washed and Screened Gravel Co.

Theodore Marvin Appointed Hercules Advertising Manager

THEODORE MARVIN has been appointed advertising manager of the Hercules Powder Co. Mr. Marvin, who has been assistant advertising manager and editor of *The Explosives Engineer,* assumes the post vacated April 5 by the death of Nelson S. Greensfelder, which was reported in the April 11 issue of Rock Products.

The new advertising manager has been an employe of Hercules Powder Co. for eight years. A graduate of the Colorado School of Mines, he became in 1923 associate editor of *The Explosives Engineer,* published by Hercules Powder Co., and in 1925 became its editor. In 1929 he was appointed assistant advertising manager.

Mr. Marvin has been active in both the advertising and technical publicity fields and is the author of handbooks on mining and tunnel methods. His appointment becomes effective immediately, according to official announcement.

Ready-Mix Concrete Plant for Mason City, Iowa

THE HENKEL CONSTRUCTION CO., Mason City, Ia., pioneer concrete construction firm, entered another phase of the industry with the announcement that it had built a plant and would put on the market mixed concrete ready for pouring.

In preparation for this business the company has erected bins, a mixer and a sidetrack into its yards on Ninth Street southeast. The sidetrack has room for six cars of materials inside the yards.

Other equipment includes a mixer bin with chambers for three aggregates of gravel, a bin for sand and a cement house which holds three carloads of cement.

Connecting these material supplies with each other and with a concrete mixer is a narrow gage railroad which carries a gas motor and two dump cars, conveying materials from the hoppers to the mixing machine.

The mixer has a capacity of 1 cu. yd. and is situated adjacent to a loading pit in which what are known as bathtub tank cars convey the mixed product to the construction project. The mixing machine was one used by the Henkel company on its pavement operations, in which it mixed as high as 500 cu. yd. a day. It is estimated that the machine will handle at least 400 cu. yd. in the plant.

All of the materials, including the water, are weighed, making certain that the mixed concrete is according to specifications.

William F. Henkel and Carl A. Henkel, who make up the company, pointed out that central mixing plants of this type are springing up in all of the larger centers.—*Mason City* (Ia.) *Globe-Gazette.*

Monessen, Penn. Concrete Block Plant Rebuilt

RECENTLY the Monessen Sand and Gravel Co. workmen completed the first order of concrete blocks with new equipment in the new plant on the Carnegie Steel grounds, Monessen, Penn.

One of the features of the new plant is the elongated drying rooms out from one side of the shop. These rooms have the appearance of miniature airplane hangars and are equipped with rails to convey trucks of blocks from the machine to the rooms and later to trucks for delivery.

Recently fire destroyed the entire block-making plant. Plans were immediately made for the erection of another building, this time all concrete blocks.

Another recent addition to the local sand and gravel company plant is the installation of a cement conveyor, consisting of an endless carrier to haul bags of cement to the mixing bin, about 35 ft. off the ground and then dump the cement into the Transit concrete mixing trucks.—*Monessen* (Penn.) *Call.*

Sand-Lime Brick Production and Shipments in March

THE following data are compiled from reports received direct from 24 producers of sand-lime brick, located in various parts of the United States and Canada. The number of plants reporting is three more than those furnishing statistics for the February estimate, published in the March 28 issue. The statistics below may be regarded as representative of the entire industry in the United States and Canada.

Reports for the month of March indicate that production has increased somewhat, as have truck shipments and unfilled orders. Shipments by rail, however, show a decrease, while stocks on hand remain about the same.

Average Prices for March

Shipping point	Plant price	Delivered
Atlantic City, N. J.	$10.00	$15.00
Dayton, Ohio	11.50	13.50
Dearborn, Mich.	13.00	14.50
Detroit, Mich.	13.00	15.50
Detroit, Mich.	.....	15.50
Grand Rapids, Mich.	.....	14.00
Iona, N. J.	11.00	14.00
Jackson, Mich.	13.00	.....
Menominee, Mich.	10.50	13.50
Milwaukee, Wis.	9.00	12.00
Minneapolis, Minn.	9.00	.....
Mishawaka, Ind.	11.00	.....
Pontiac, Mich.	11.00	13.00
Saginaw, Mich.	12.00	.....
Sioux Falls, S. Dak.	12.00	.....
Syracuse, N. Y.	18.00	20.00
Tampa, Fla.	9.00	.....
Toronto, Can.	11.00	13.00

The following statistics show a comparison of the figures for February and March:

Statistics for February and March

	*February	†March
Production	4,139,670	4,868,840
Shipments (rail)	1,492,938	1,466,348
Shipments (truck)	3,306,038	3,742,653
Stocks	12,544,898	12,566,492
Unfilled orders	6,720,000	7,070,000

*Revised to include the figures from one plant not reported in the staistics published in the March 28 issue. Twenty-one plants reporting. Incomplete, one plant not reporting production and eight not reporting unfilled orders.

†Twenty-four plants reporting. Incomplete, one not reporting production and eight not reporting unfilled orders.

Notes from Producers

Plant City Brick Co., Tampa, Fla., furnished sand-lime brick for the Y. W. C. A. building.

Acme Brick Co., Milwaukee, Wis., reports that it has received the orders for brick for two city schools and one state school.

Evidence of the fire-resistance of sand-lime brick in construction is shown by the accompanying view showing a veneered brick residence in Milwaukee's rural district which was destroyed by fire, the 4-in. sand-lime brick veneer being all that was left.

Nothing left but sand-lime brick veneer

Cast Stone Institute to Meet in Cleveland, May 11 and 12; Manufacturers Invited

AN ANNOUNCEMENT of interest to all cast stone manufacturers is that the annual convention of the Cast Stone Institute will be held in Cleveland, Ohio, May 11 and 12, at the Hotel Cleveland. Every cast stone manufacturer who is interested in the future of the industry is cordially invited to attend this meeting, whether or not his company is a member of the Institute.

Never in its history have the problems facing the cast stone industry been of greater interest and more importance than at present. Neither has the industry ever had better means at its disposal for meeting its problems than is now offered in the Cast Stone Institute. The Institute's third annual report, to be presented at the Cleveland convention, will show that considerable progress has been made during the past year in establishing wider recognition for standards of quality in cast stone, in arousing greater interest among manufacturers in improving their product, and in demonstrating the effectiveness of co-operative action in solving the problems of the industry.

It is felt that the convention program will be of unusual interest to cast stone manufacturers. P. H. Bates, of the United States Bureau of Standards, will discuss research as it is applied to concrete. He will explain the fundamental principles upon which scientific research is based and he will also explain the interpretation and application of the results of research. C. H. Randolph, of the Minnesota Mining and Manufacturing Co., will explain and demonstrate some recent developments in stone finishing methods and equipment which are rapidly revolutionizing the granite, marble and stone industries and which offer exceptional opportunities to cast stone manufacturers. A comprehensive report will be made by C. G. Walker, assistant secretary, on the status of cast stone in government building and the prospects for a more extensive use of it in such work. A number of other interesting papers are also on the program.

Information as to hotel accommodations and railroad rates can be obtained from the assistant secretary of the Institute at 33 West Grand avenue, Chicago.

Current Prices of Ready-Mix Concrete

HEREWITH is a tabulation of current prices for ready-mix concrete, which will be a regular monthly feature of ROCK PRODUCTS. This is the first published tabulation of prices in representatives cities, both large and small, so far as the editors know.

A study of the tabulation will prove interesting. There is no uniform method of measuring mixed concrete. The cubic yard measure is by far the most popular, but it would seem open to the same objections as selling aggregates by the cubic yard.

Zones in the large cities appear to be quite generally based on the radial distance from the plant, each zone being a mile-width belt.

In several instances high-early-strength concrete mixes are being sold, as well as standard cement mixes.

AMARILLO, TEX.—Prices per cu. yd.*

Mix		Mix	
1–2 –0	12.50	1–2¾–5	9.00
1–2 –3½	9.75	1–3 –5	8.75
1–2 –4	9.50	1–3 –6	8.50
1–2½–5	9.25		

*For orders of 50 cu. yd. or more, prices are 75c less per cu. yd. than quoted. Free delivery within city limits for 2 cu. yd. or more per load; $1.00 per load extra for less than 2 cu. yd. loads, except to finish a job.

CHAMPAIGN, ILL.—Prices per ton†

Mix		Mix	
1–2–3	5.50	1–2–4	5.00
1–3–5	4.75		

†5% cash discount.

CAMBRIDGE, MASS.—Base price per cu. yd.‡

Mix		Mix	
1–2– 4 (3 to 30 cu. yd.)	10.00	1–2– 3 (30 cu. yd. and over)	8.20
1–2 –4 (30 cu. yd. and over)	7.75	1–1½–3 (3 to 30 cu. yd.)	10.55
1–3 –6 (3 to 30 cu. yd.)	9.50	1–1½–3 (30 cu. yd. and over)	8.30
1–3 –6 (30 cu. yd. and over)	7.25	1–1–2 (3 to 30 cu. yd.)	11.30
1–2½–5 (3 to 30 cu. yd.)	9.75	1–1–2 (30 cu. yd. and over)	9.05
1–2½–5 (30 cu. yd. and over)	7.50	1–2 (3 to 30 cu. yd.)	13.00
1–2 –3 (3 to 30 cu. yd.)	10.45	1–2 (30 cu. yd. and over)	10.75

‡Discount of 50c per cu. yd. allowed on deliveries made between the 1st and 15th of the month if bill is paid on or before the 25th and on deliveries made between 15th and 30th if paid on or before the 10th of following month.

CLEVELAND, OHIO—Prices per cu. yd. to contractors for orders of 2 cu. yd. or more (a); Public Square basing point.

Mix	1st mile	2nd mile	3d mile (Maximum)
1–1 –2	8.70	8.95	9.20
1–2 –3	7.40	7.65	7.90
1–2 –4	7.00	7.25	7.50
1–2½–3½	7.00	7.25	7.50
1–2½–4	6.75	7.00	7.25
1–3 –4	6.60	6.85	7.10
1–2½–5	6.60	6.85	7.10
1–3 –5	6.40	6.65	6.90
1–3 –6	6.25	6.50	6.75
1–2 Finish	8.50	8.75	9.00
1–2½ Finish	7.90	8.15	8.40
1–3 Finish	7.25	7.50	7.75

(a) Industrials or consumers 50c more than contractors. Extra charge for concrete delivered nights, Sundays or holidays, $1.00 per cu. yd. over daytime schedule. For "Velo" or "Incor" additional charge of $2.00 per cu. yd. For waterproof or plastic cements, additional charge of $1.25 per cu. yd. For orders less than 2 cu. yd. add $1.00 per yd. to above prices. Prices quoted are based upon normal discharge of load within 20 minutes after arrival of truck. A demurrage charge of $1.00 for each 15 minutes thereafter.

COLUMBUS, OHIO—Delivered prices per cu. yd.

Mix	Zones§ 1	2	3	4	5	6	7	8	9	10
1–1½–3	7.05	7.25	7.45	7.65	7.85	8.05	8.25	8.45	8.65	8.85
1–2 –3	6.85	7.05	7.25	7.45	7.65	7.85	8.05	8.25	8.45	8.65
1–2 –3½	6.65	6.85	7.05	7.25	7.45	7.65	7.85	8.05	8.25	8.45
1–2 –4	6.45	6.65	6.85	7.05	7.25	7.45	7.65	7.85	8.05	8.25
1–2½–4	6.35	6.55	6.75	6.95	7.15	7.35	7.55	7.75	7.95	8.15
1–3 –4	6.25	6.45	6.65	6.85	7.05	7.25	7.45	7.65	7.85	8.05
1–2½–5	6.15	6.35	6.55	6.75	6.95	7.15	7.35	7.55	7.75	7.95
1–3 –5	6.05	6.25	6.45	6.65	6.85	7.05	7.25	7.45	7.65	7.85
1–3 –6	5.95	6.15	6.35	6.55	6.75	6.95	7.15	7.35	7.55	7.75
1–4 –8	5.85	6.05	6.25	6.45	6.65	6.85	7.05	7.25	7.45	7.65
1–2	9.55	9.75	9.95	10.15	10.35	10.55	10.75	10.95	11.15	11.35
1–3	7.95	8.15	8.35	8.55	8.75	8.95	9.15	9.35	9.55	9.75

§All zones radiating from center of city. Zone 1 is one mile in radius, zone 2 is two miles in radius, zone 3 is three miles in radius, etc. Discount of 25c per cu. yd. allowed for payment 10th of month following delivery date. For orders over 50 cu. yd. a deduction of 25c per cu. yd. is allowed. Orders of less than 2 cu. yd. carry same haul charge as 2 cu. yd. load. Orders for 2 cu. yd. or over delivered in full loads at 2 yd. or more. No extra charge made for finishing load if less than 2 cu. yd.

FAIRMONT, W. VA.—Prices per cu. yd. (c)

Mix	Quantity	Delivered	Called for
1–2–4	Less than 1 cu. yd.	11.00	10.00
1–2–4	From 1 to 4 cu. yd.	10.00	9.00
1–2–4	From 5 to 10 cu. yd.	9.50	8.50
1–2–4	From 11 to 49 cu. yd.	9.00	8.00
1–2–4	From 50 cu. yd. and up	8.50	7.50

(c) For 1–2–3 mix add 50c per cu. yd. to prices quoted; for 1–3–5 mix deduct 50c per cu. yd. from prices quoted.

DES MOINES, IOWA—Prices per cu. yd. (b)

(Made with ¾-in. gravel for structural work)

Mix	Slump	Plant price	Zone A	B	C	D
1–2½–5	2 in.	6.50	7.00	7.25	7.50	7.75
1–2½–5	6 in.	6.75	7.25	7.50	7.75	8.00
1–2 –4	2 in.	7.00	7.50	7.75	8.00	8.25
1–2 –4	6 in.	7.25	7.75	8.00	8.25	8.50
1–2 –3½	2 in.	7.50	8.00	8.25	8.50	8.75
1–2 –3½	6 in.	7.75	8.25	8.50	8.75	9.00
1–2½–3	2 in.	8.00	8.50	8.75	9.00	9.25
1–2½–3	6 in.	8.25	8.75	9.00	9.25	9.50

(Made with pea gravel for cellar and sidewalks)

Mix	Slump	Plant price	Zone A	B	C	D
1–2½–5	2 in.	6.25	6.75	7.00	7.25	7.50
1–2½–5	6 in.	6.50	7.00	7.25	7.50	7.75
1–2 –4	2 in.	6.75	7.25	7.50	7.75	8.00
1–2 –4	6 in.	7.00	7.50	7.75	8.00	8.25
1–2 –3½	2 in.	7.25	7.75	8.00	8.25	8.50
1–2 –3½	6 in.	7.50	8.00	8.25	8.50	8.75
1–2½–3	2 in.	7.75	8.25	8.50	8.75	9.00
1–2½–3	6 in.	8.00	8.50	8.75	9.00	9.25

(b) Discount of 50c per cu. yd. allowed on deliveries made between the 1st and 15th of the month if bill is paid before the 25th and on deliveries made between 16th and 30th if paid before the 10th of following month. Quick setting $2.00 per cu. yd. extra; waterproofing, $2.00 per cu. yd. extra. Each zone approximately one mile.

HARTFORD, CONN—Prices per cu. yd. delivered

Mix		Mix	
1–2–4	(d) 7.15–7.25	1–2–0 finish	12.00
1–3–5	(d) 6.25–6.75		

(d) Placing, $1.00 per cu. yd. extra.

MEMPHIS, TENN.—Prices per cu. yd. delivered in city.

Strength	With gravel aggregate	With stone aggregate	Strength	With gravel aggregate	With stone aggregate
4000 lb.	11.00	11.18	2000 lb.	8.00	8.40
3500 lb.	9.50	9.84	1800 lb.	7.30	8.25
2800 lb.	8.70	9.35	1600 lb.	7.10	8.05
2400 lb.	8.40	8.78			

MILWAUKEE, WIS.—Prices per cu. yd. (e)

28-day breaking strength:	Per sq. in.	Slump 2 to 4 in.	4 to 6 in.	6 to 8 in.
Garage footings and walls	2000 lb.	7.00	7.40	7.80
Footings, floors, walls	3000 lb.	7.50	7.90	8.30
City paving	3300 lb.	7.75	8.00	8.40
Sidewalks, curbs	4000 lb.	8.25	8.75	9.25
24-hour high early strength	5000 lb.	10.00	10.50	11.00

Sold on old mixture method, 2- to 4-in. slump; 4- to 6-in. slump; 6- to 8-in. slump.

	Mix	
Walls—Garage footing	1–3–5	7.00
City paving	1–2–4	7.50
Garage floors, walls	1–3–3	7.50
Sidewalk	1–2–3	8.00
Special strength (machine bases)	1–1½–2½	9.50
Facing	1–3	10.50
Facing	1–2	12.00

(e) Discount of 25c per cu. yd. if paid by 10th of following month.

MORGANTOWN, W. VA.—Prices for jobs of 1 to 10 cu. yd., delivered.(f)

Mix		Mix	
1–2–3	9.50	1–2½–4	8.90
1–2–4	9.00	1–2½–5	8.50

(f) Prices subject to cash discount of 25c per cu. yd. for payment 15 days from date of invoice.

MONTGOMERY, ALA.—Prices per cu. yd. delivered in city limits. (g)

Mix		Mix	
1–2 –4	7.75	1–3–6	7.00
1–2½–5	7.25	1–2 mortar topping	13.00

(g) Discount of 25c per cu. yd. for payment in 30 days. Special quotations for quantity orders.

NEW ORLEANS, LA.—Plant prices per cu. yd. for 30 yd. or less. (h)

Mix	Cement Portland	"Incor"	Mix	Cement Portland	"Incor"
1–4 –8	6.10	7.25	1–2 –2	8.65	11.80
1–3 –6	6.70	8.25	2–3 –6	9.10	12.20
1–3 –5	6.90	8.65	2–3 –3	9.85	13.75
1–2½–5	7.20	9.15	1–1½ topping	11.70	17.80
1–2½–4	7.35	9.50	1–2 topping	10.05	14.95
1–2 –4	7.70	10.05	1–3 topping	8.55	12.25
1–2 –3	8.15	10.85			

(h) Various charges, in excess of plant prices, are made for delivery based on zones. A 5% discount for payment 15 days from date of invoice is allowed on all delivered prices; otherwise 30 days net.

PITTSBURGH, PENN.—Range of prices, according to zone, for ready-mixed concrete. Prices per cu. yd. delivered, up to 200 cu. yd. (j)

Mix	Strength	
1-1½-2½	4000 lb.	9.05–10.05
1-2 -3	3500 lb.+	8.65– 9.65
Class A	3500 lb.	8.45– 9.55
1-2½-3½	3000 lb.+	8.35– 9.45
1-2 -4 Class B	3000 lb.	8.25– 9.35
1-2½-4½	2500 lb.+	8.05– 9.15
1-2½-5	2500 lb.	7.90– 9.00
1-3 -5	2000 lb.	7.80– 8.90
1-3-6	1500 lb.	7.65– 8.75

Prices per cu. yd. delivered, over 200 cu. yd. (j)

Mix	Strength	
1-1½-2½	4000 lb.	8.05– 9.80
1-2 -3	3500 lb.+	7.65– 9.40
Class A	3500 lb.	7.45– 9.20
1-2½-3½	3000 lb.+	7.35– 9.10
1-2-4 Class B	3000 lb.	7.25– 9.00
1-2½-4½	2500 lb.+	7.05– 8.80
1-2½-5	2500 lb.	6.90– 8.65
1-3 -5	2000 lb.	6.80– 8.55
1-3 -6	1500 lb.	6.65– 8.40

(j) Class A concrete is a special concrete prepared for the city of Pittsburgh. Plus indicates the strength shown is the minimum strength. Dealer's commission of 50c per cu. yd. allowed in all zones with exception of Yellow Zone. No commission allowed over 200 cu. yd. Prices subject to cash discount of 25c per cu. yd. for payment 15 days from date of invoice.

PUEBLO, COLO.—Prices per cu. yd.

Strength		Strength	
3000 lb.	8.40	2100 lb.	7.50
2700 lb.	8.15	1200 lb.	6.90
2400 lb.	7.90		

ROCHESTER, N. Y.—Prices per cu. yd. at plant.

Mix		Mix	
1-2 -3	8.00	1-4-5	7.00
1-2½-3½	7.50	1-5-6	6.50
1-3½-4½	7.25		

SAN ANTONIO, TEX.—Prices per cu. yd. on city deliveries.

Mix		Mix	
1-3-5	7.50	1-2-4	8.00

SAN JOSE, CALIF.—Prices per cu. yd. delivered within one mile of plant. (k)

Mix	Up to 5 cu.yd.	Over 5 cu.yd.	Mix	Up to 5 cu.yd.	Over 5 cu.yd.
1-6	9.00	8.50	1- 9	8.00	7.50
1-7	8.50	8.00	1-12	7.00	6.50

(k) For deliveries outside of this area add 30c per cu. yd. per mile. Cash discount of 50c per cu. yd. if paid in full by 10th day of following month.

SANTA CRUZ, CALIF.—Price per cu. yd. delivered within two-mile radius of plant. (l)

Mix	Over 5 cu.yd.	Less than 5 cu.yd.	Mix	Over 5 cu.yd.	Less than 5 cu.yd.
1-6	9.00	9.50	1-8	8.10	8.60
1-7	8.50	9.00	1-9	7.90	8.40

(l) For deliveries outside of this area add 30c per cu. yd. per mile. Cash discount of 50c per cu. yd. if paid in full by 10th day of following month.

SPRINGFIELD, ILL.—Prices per cu. yd.

Mix		Mix	
1-3 -6	9.20	1-2 -3½	10.30
1-3 -5	9.40	1-2 -3	10.50
1-2½-4	9.70	1-1½-3	10.70
1-2 -4	10.00	1-1 -2	12.50

ST. PAUL, MINN.—Prices per cu. yd. delivered within three miles of plant. (m)

1-2-4 mix	6.75	1-3-5 mix	6.30

(m) For greater distances of haul, increase of 10c per cu. yd. per mile.

WILKES-BARRE, PENN.—Prices per cu. yd. delivered within one mile of plant. Extra charge of 15c per cu. yd. for each additional mile.

Mix	Gravel	Stone	Mix	Gravel	Stone
1-2 -3	8.00	8.45	1-3-5	7.25	7.70
1-2 -4	7.75	8.20	1-3-6	7.25	7.70
1-2½-5	7.50	7.95			

Ready-Mix Concrete Plant for Lancaster, Penn.

A NEW INDUSTRY, that of manufacturing and distributing ready-mixed concrete, will be established in Lancaster and will probably begin operating some time late in May, it was announced recently at Lancaster, Penn.

The company, to be known as the Ready Mixed Concrete Co., of Lancaster, will be located at West Walnut and Water streets, and will involve a total investment of approximately $70,000. The owner will be Arthur M. Dives, of Reading, Penn., who also operates similar plants in Reading and York, and has another under construction in Baltimore, Md.

Approximately fifteen persons will be employed in the plant, including truck drivers, according to C. D. Eisenberg, also of Reading, director of sales for the organization, who formally announced for Mr. Dives that the plant would be established in Lancaster.

The plant is to be constructed by John H. Wickersham, local contractor, who was granted a building permit by City Building Inspector Herbert Shartle, covering erection costs of $25,000.

In discussing the plans for the Lancaster plant, Mr. Eisenberg stated that it will have a capacity production of about 650 cu. yd. of mixed concrete per day, figuring on the basis of a ten-hour working day. The trucks, which will be in use will have a hauling capacity of 3 cu. yd., or approximately six tons of concrete.

The six trucks, with agitating mechanism, costing $7500 each, will represent an investment of $45,000, which together with the cost of building erection of $25,000 represents the total investment of the company.

These trucks will be equipped with heating attachments, so that the work can be carried on in winter. This factor alone, Mr. Eisenberg stated, will be of great aid to contractors who desire to do concrete work when the weather is extremely cold.

Many big contracting firms have found it very convenient to purchase their concrete in ready-mixed form instead of doing their own mixing, according to Mr. Eisenberg. At present, the Reading plants are employed in furnishing mixed concrete for a large bridge now being erected there, he said.

No personnel has been selected for the Lancaster company, it was learned. However, the fact that no Reading officials will be moved here was stressed in the announcement.

In addition to the actual mixing plant, storage space for approximately 100 tons of sand, 200 tons of stone and two carloads of bulk cement will be maintained.—*Lancaster* (Penn.) *Intelligencer.*

Tulsa, Okla., Ready-Mix Plant Gets Helpful Publicity

A GOOD EXAMPLE of a helpful newspaper story on ready-mix concrete is that in a recent issue of the *Tulsa* (Okla.) *World.* Here it is:

"Have you a lily pond to be built this spring or does the driveway need repairing? Perhaps you would not think of calling up a big contracting firm to ask them to furnish you a square yard or so of concrete, but the H. L. Cannady Co., with yards and offices at 1116 South Lewis Street, handles small as well as large orders and can sell you a few cubic yards of mixed concrete for your lily pool just as readily as they can build such civic enterprises as the Boston Avenue overpass at the new Union station.

"At this season of the year every home owner is busy with repair work or home improvements and since rock gardens and garden pools are so popular the question of ready mixed concrete is important.

"The Cannady company has a mixer by which concrete exactly suited to the requirements of any special small job can be delivered by the truck load, as little as a cubic yard, or as much as desired. The patented mixer mixes the concrete as it travels and is especially designed to protect property from damage by having the heavy truck driven over lawns.

"Suppose a garden pool is to be built. The concrete is ordered and the company knows exactly what mixture is required. The concrete is measured in the exact proportions, the truck is started and by the time its destination is reached the concrete is mixed. Then, if the place where the concrete is to be dumped is not more than 8 ft. from the drive upon which the truck can be driven the mixture can be dumped in exactly the spot where it is wanted without disturbing lawns. A pipe that swings from the tank carries the mixture to the exact spot. If the home owner wishes, the Cannady company can furnish an experienced man to lay the concrete on a small job, although this work is not solicited.

"One of the successful phases of this company's business has been the laying of driveways in different colors—not driveways or walks that are painted or colored after being laid, but with the natural color in the limestone rock that is used in the concrete, a number of shades ranging from pale gray to browns that make a variety in neighborhood drives and that are most attractive."

Unloading, Distributing and Reclaiming System for Silos or Standard Bins

By R. F. Bergmann

Chief Engineer, H. W. Caldwell & Son Co., Chicago

PRODUCERS OF ROCK PRODUCTS who are interested in furthering their sales of material in bulk will frequently meet with requests from prospective purchasers for information and recommendations on the arrangement and choice of unloading equipment for small silo or bin storage plants.

While the larger consumers or dealers have developed very efficient and successful plants for the handling of bulk cement, lime and gypsum products, the buyer of only a car or two per day, or even less, cannot afford such expensive or elaborate equipment. Yet it is to the advantage of the industry that such purchasers avail themselves of economical, efficient and dependable bulk material handling machinery.

For unloading bulk materials from box cars at the rate of 10 to 15 tons per hour, the automatic power unloading shovel (Fig. 1) is probably as simple and economical a mechanical device as is available. After the car is broken out into the hopper at the door, one operator handling the scoop, which is pulled by cable from the automatic shovel mechanism, can unload at a rate of 10 to 15 tons per hour with comparative ease.

Fig. 1. Automatic unloading shovel with driving mechanism

The shovel mechanism is operated by a 5- or 7½-hp. motor, preferably one with high pull-out torque capacity, through a speed reducer and roller chain drive as shown in Fig. 1. Other forms of transmission may be used, such as spur gears, silent chains, planetary or herringbone gear reducers. A typical driving arrangement, shown in Fig. 1, is quite compact and especially well adapted to the platform space available.

To provide clearance for locomotives and cars on the siding, the unloading hopper must be hinged, and it should be of liberal width to span the car door. The car door sheaves are incorporated as a part of this swinging hopper, and the entire assembly is lifted to clear cars or locomotives by a worm gear hand winch with cable and sheaves as shown in Fig. 2.

In the chute to the elevator boot, a bar grating is provided to prevent oversize material, planks, blocks or chips from damaging the elevator or conveyors. This grating also serves to arrest the flood of material as it is dumped into the hopper by the scoop, relieving the load on the elevator to some extent.

Fig. 2 shows the recommended design of a small vertical continuous type chain and bucket elevator with steel casing and boot, head machinery platform, motor and worm reducer drive. The take-ups are located at the head, with a roller chain drive from reducer to elevator headshaft so arranged that take-ups may be adjusted without lengthening or cutting drive chain. From the reducer low speed shaft the distributing screw conveyor from the elevator head may also be operated by a roller chain drive with clutch.

A reclaiming screw conveyor is located as shown in Fig. 2, arranged to return the material from storage to the bucket elevator for recirculating or to elevate it to the batching or processing unit at the plant. This conveyor is driven from the elevator boot shaft by a roller chain drive, with a clutch which may be disengaged when the conveyor is not in use.

The unloading and material handling equipment shown is simple and flexible, adapted to almost any form of silo, or with some modifications, to standard bins. It offers expansion possibilities in the shape

of additional storage units with only minor extensions to the distributing and reclaim conveyors.

For Central Mixing Plants

With a minimum amount of equipment, this layout will serve the average central concrete-mixing plant with adequate bulk cement unloading and handling facilities. Bulk pebble lime, soda ash and other similar products may also be handled with practically the same equipment at small storage plants.

Producers of rock products can equip their sales or service departments with typical layouts, installation and equipment costs, silo or bin prices and approximate operating costs for customers of materials. While the arrangement of storage and unloading units may vary considerably, the approximate figures for the installation and operating costs may be tabled conveniently for estimate and appropriation purposes. Such material will undoubtedly assist in developing sales in bulk carload lots.

Canadian Gypsum Co., Ltd., to Build New Plant in Ontario

THE Canadian Gypsum Co., Ltd., at 1221 Bay street, Toronto, Ont., announces the purchase of property at Willow Grove, Ont., just south of Hamilton, where a new vein of rich, massive gypsum has been located.

Construction work will start immediately, including mill office, plaster mill, board plant and warehouse.

With the development of this property, Canadian Gypsum Co., Ltd., completes a chain of operations in eastern Canada. The company is now in a strong position, due to consolidated operations, centrally located.

The Canadian Gypsum Co., Ltd., was incorporated in 1907 at Windsor, Nova Scotia. In 1925, Canadian Gypsum Co., Ltd., purchased the plants, properties, mines, quarries, docks and boats of the J. B. King Co., operating at Windsor, Digby and Hillsboro. The Gypsum Packet Line, a subsidiary of the Canadian Gypsum Co., has added a fleet of self unloading ocean steamers to carry on their export of nearly a million tons of crude gypsum and finished products.

In September, 1930, the Canadian Gypsum Co., Ltd., purchased the plants, properties, mines, quarries and docks of the Albert Manufacturing Co., Hillsboro, New Brunswick. A modern wallboard plant of considerable size was erected during the winter months to manufacture "Sheetrock" wallboards and "Rocklath," giving employment to many additional employes. The Albert Manufacturing Co. was established in 1854 and has been in continuous operation since that time, building up a substantial business in the special uses of pure white gypsum.

On March 31, 1931, Canadian Gypsum Co., Ltd., purchased the plant, property and business of the Standard White Lime Co. at Guelph, Ont. Warehouses have been opened in some of the principal marketing centers to complete the distribution in eastern provinces.—*Toronto* (Ont.) *Star.*

The Canadian Gypsum Co., Ltd., is the Canadian subsidiary of the United States Gypsum Co., Chicago, Ill.

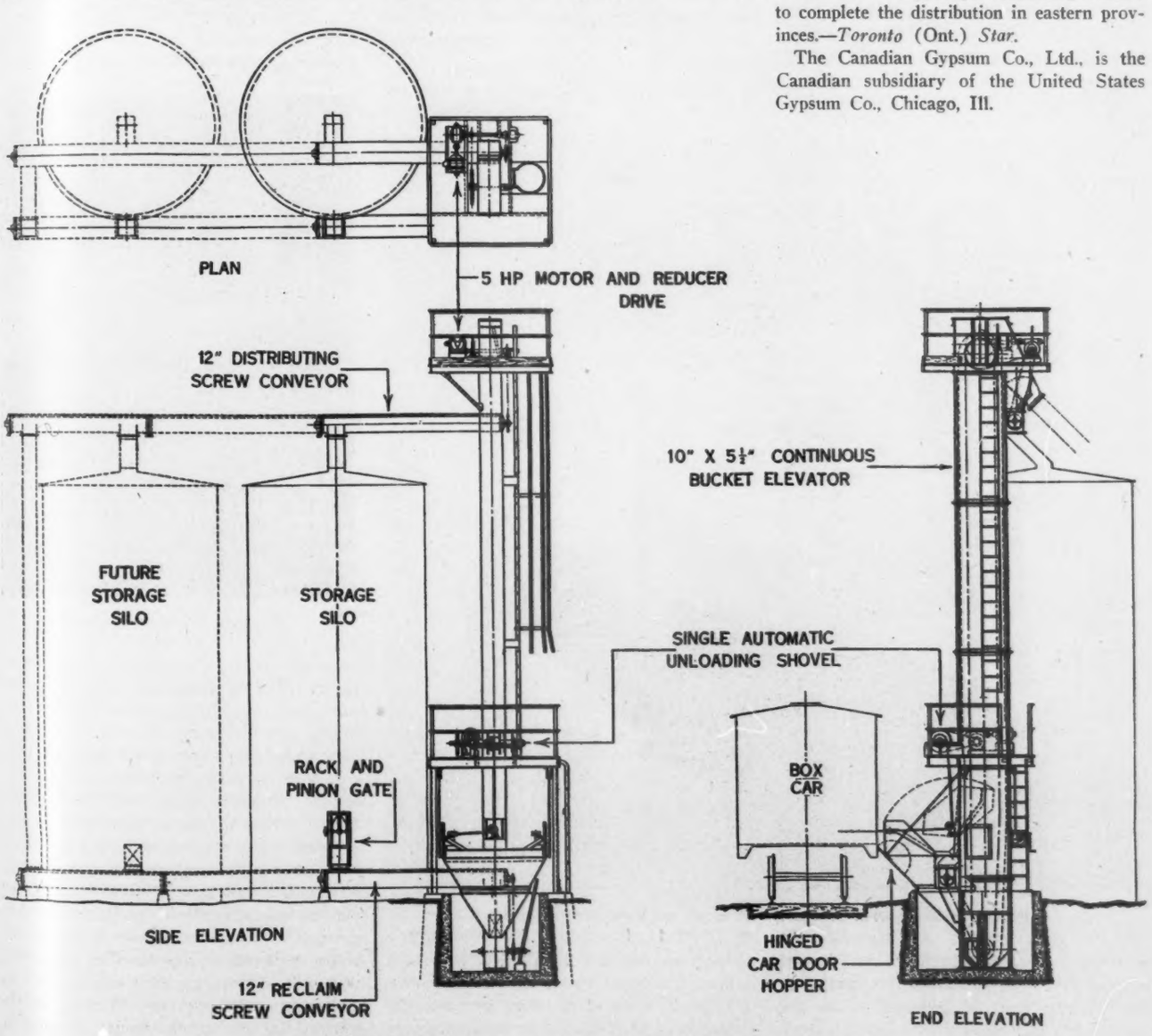


Fig. 2. Unloading device shown in relation to cars and storage

New Machinery and Equipment

New Packing in Coils

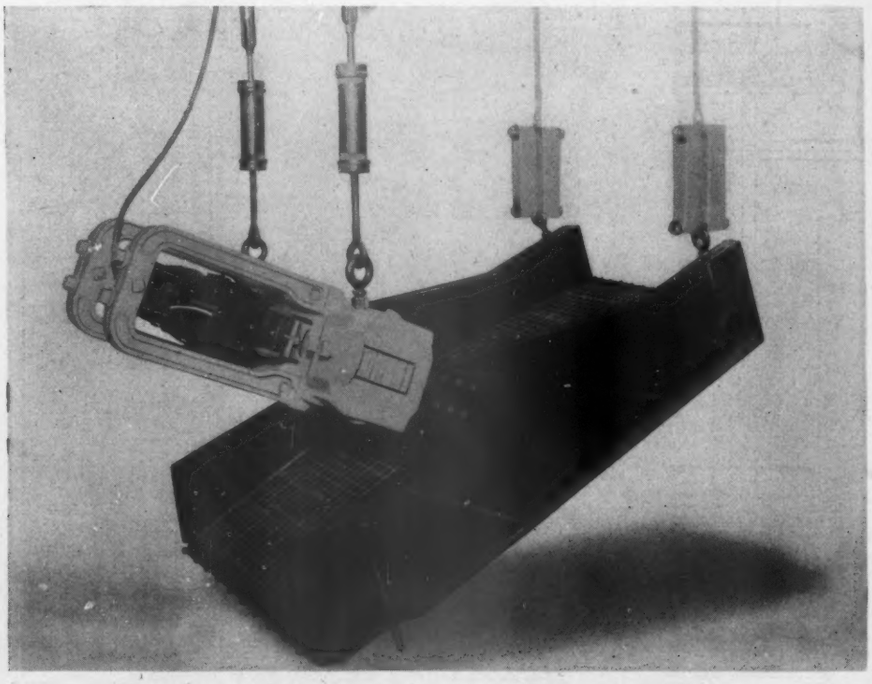
IT IS NOW POSSIBLE to obtain "Metalastic" packing in coil form. This is the new packing described in Rock Products in the September 27, 1930, issue. It is a fibrous strand of asbestos particles impregnated with a metallic powder and lubricant. The manufacturer claims that it will withstand temperatures to over 1200 deg. F., and will render satisfactory service for all acids, fluids, gases, alkalies, and electrolysis. It has previously been sold only in short straight lengths; now it may be had in coil form in fourteen sizes. The thought back of this product is to offer one satisfactory packing suitable for all services, which will do away with the storeroom full of countless varieties of specialized packings. It is made by the Metalastic, Inc., Union City, N. J.

New Development in Screens

THE TRAYLOR VIBRATOR CO., Denver, Colo., announced some time ago the development of the "Trayco Conveyan-screen," which is said to bring a number of new and interesting practices into the art of screening. The power unit, designated as the vibrator unit, is mounted above the screen sash and imparts its vibration at an angle to the screening plane. This rapid oscillation is claimed to produce a sharp screening action as well as a conveying motion. Thus, the screen can be operated practically flat and, therefore, does away with the necessity of setting the screen at an angle where gravity will cause the flow of the material across its surface.

The manufacturer states the "Conveyan-screen" produces more accurate sizing because the angle of vibration causes the material to keep in closer contact with the screen cloth. The power units which vibrate the sash are the same type and design as those used on Traylor vibrating conveyors, which have been in use in conveying practice a number of years. The vibrator is suspended so that all the vibration is absorbed within the unit and none is transmitted to building supports.

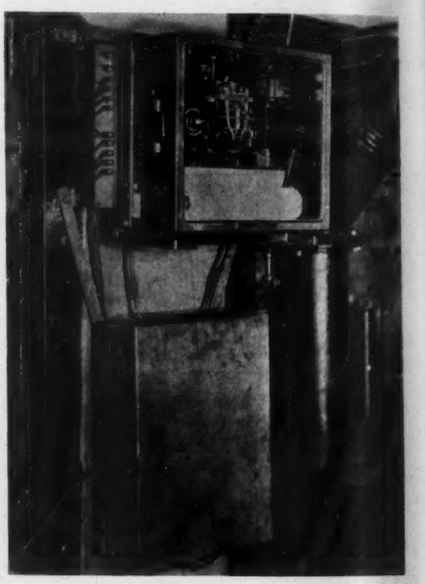
Standard alternating current is used and through the use of a small motor generator set, furnished with the screen, the intensity of vibration is under rheostat control and can be varied to meet individual requirements. The screen is furnished in 4 standard widths and in any length necessary to accomplish the duty. On single and double deck screens, up to 6 ft. in length 1 vibrator is used. On screens over 6 ft. long and up to 12 ft. in length 2 vibrators are used. On screens over 12 ft. long, 3 or more vibrators are used to oscillate the screen sash. The steel sash of the screen, over which the screen cloth is tightly stretched, is vibrated as a unit. All cross ribs, for the support of the screen cloth, are equipped with specially molded rubber strips which protect and prolong the life of the screen cloth. It is claimed a complete renewal of cloth can be made without special tools in ten minutes.



Power unit imparts vibration at angle to screening plane

Smoke Recording and Reporting Instrument

IN ORDER TO AFFORD the boiler room a constant indicator and the engineer's office a written record of the smoke condition of the plant stack, Leeds and Northrup Co., Philadelphia, Penn., has developed a new apparatus for this dual purpose. A measuring chamber is installed in the stack breeching through which the smoke passes before entering the stack. The manufacturer states that by placing an electric lamp in one end of the chamber and a specially constructed temperature compensated thermopile in the other, the density of the smoke affects the amount of heat from the electric lamp reaching the thermopile. This in turn is connected to a standard L. and N. potentiometer recorder which furnishes a constant and written record. This transcription may be read directly in smoke density percentages or Ringelmann chart numbers. The boiler room indicator is a bank of five lamps, the color or brilliancy of the lamp filament indicating constantly to the fireman the smoke condition of the stack. The manufacturers claim for this device that it is sim-



Writing the stack record

ple, fool-proof, reliable; that it is easily installed and will not get out of order, and that the density measurement is not affected by current fluctuations.

New Dragline Chain

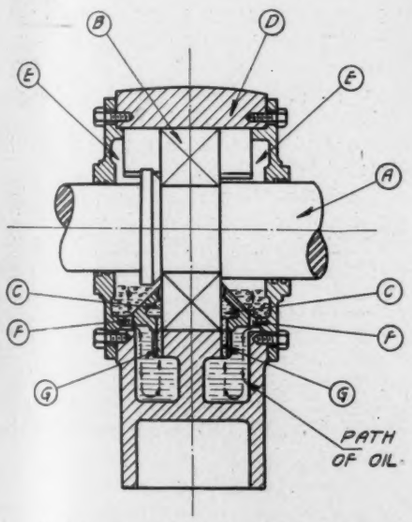
THE NATIONAL MALLEABLE and Steel Castings Co., Cleveland, Ohio, has developed a new chain for dragline service, marketed under the name of "Naco" dragline chain.

The manufacturers state that this chain is cast from Naco steel by a process used exclusively by this company. Each link is cast in one solid piece in a sand mold made from standard patterns, so that every link is uniform in size, shape, weight and wire gage diameter, and there are no joining welds or other weak spots in the link to break or shorten its life.

Special Bearing Enclosure

F. L. SMIDTH AND CO., New York City, have designed a special bearing enclosure for their cement-mill machinery. The manufacturers claim this enclosure will provide proper lubrication of ball or roller bearings operating at high speeds.

The accompanying illustration shows the



Lubricating ball or roller bearings

principle of this housing enclosure. When the shaft *a* is rotated at high speed, the ball or roller bearing *b* picks up the oil from reservoir *c* and throws it against the housing *d* and the end covers *e*. The surfaces of the housing and the end covers with which the oil comes into contact, cools the oil, the heat being conducted through these members and dissipated into the surrounding atmosphere. The throwing of the oil against the housing *d* and end covers *e* causes the oil to foam and contain air filled bubbles. This foamy oil then drains by gravity through the opening *f* into the lower reservoir. Thus the confined air in the bubbles has a chance to escape and the oil soon returns to its natural state before it enters the lower chamber.

The oil then passes up through the tubular opening *g* into the reservoir *c* where it again comes into contact with the ball or roller bearing and the cycle is repeated.

According to the manufacturer tests on machines in service, equipped with this special bearing enclosure, show that the bearings run cool and that satisfactory results are obtained.

Truck Mixer and Agitator

THE BLAW-KNOX CO., Pittsburgh, Penn., announces a truck concrete-mixing unit designed both for mixing or for use as a closed type agitating body for conveying premixed concrete.

The "Trukmixer," it is claimed, provides positive water control, thorough, uniform and rapid mixing, and clean discharge of all consistencies of concrete mixes.

Forced feed automatic water-supply system with this concrete mixing unit

The octagonal mixing drum, tapered on both ends, automatically reverses rotation during mixing. Mixing blades may be removed and replaced as units in short sections.

A forced feed automatic water-supply system can be set to control the amount of free water used in each batch. The manufacturer says the position of the truck body does not affect this water-supply system. Water is distributed within the drum from four points. Sprays are protected from clogging. Water-supply tanks are carried below the chassis.

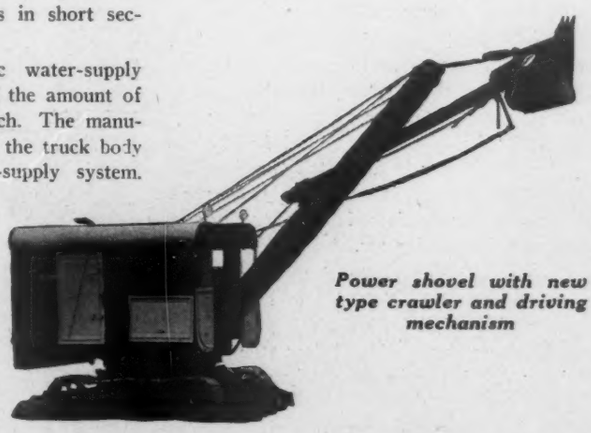
A screw type discharge door is used. The operator controls the action of the drum during discharge from the discharge end. It is said discharge is rapid and without pulsation.

A separate engine unit actuates the mixer. The controls of the water pump and of this mixer engine are accessible from the driver's seat.

The "Trukmixers" are made in capacities of 2, 3, 4, and 5 cu. yd. for mixing, and from 2 to 8 cu. yd., for agitating pre-mixed concrete.

Improvements on Power Shovels

ANNOUNCEMENT IS MADE of a new type crawler and driving mechanism for the "Whirlwind" ⅜-yd., the "Speeder 90" 1¼-yd. and the "Speeder B3" ½-yd. full-revolving gasoline shovels manufactured by Speeder Machinery Corp., Cedar Rapids, Iowa. The new crawlers and driving mechanism are designed, it is stated, to eliminate friction and expedite repairs and adjustment while on the job. The new crawlers are lug driven, of 16-in. width and hinged by three eyes. A roller idler now replaces the idler sprocket on the front of the crawlers. All carrier trunnions and return idlers are bronze bushed. The traction shaft is splined and supported by four bronze split bearings, and is in three separate shafts rather than in one long shaft, permitting any particular section to be adjusted or removed. The travel gears are machine cut, heat treated, case hardened and run in grease.

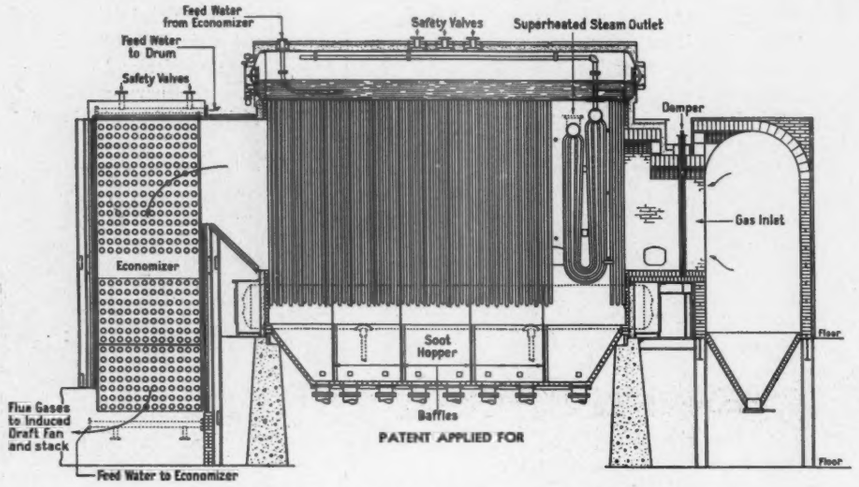


Power shovel with new type crawler and driving mechanism

Three-Drum Waste Heat Boiler

THE BABCOCK AND WILCOX CO., New York City, announces a new waste heat boiler known as B. and W. "three-drum" waste heat boiler.

This boiler, said to be especially adapted for the utilization of waste heat in the cement industry, features a high rate of heat transfer with a draft loss that is unusually low. Special features of construction are designed to eliminate the most common source of brick-work trouble and to reduce air infiltration to a minimum.



Cross-section view of new three-drum waste heat boiler

This boiler has three drums, one upper or steam-and-water drum, and two lower or mud drums. The seamless steel tubes connecting the lower drum to the upper drum are staggered and are placed closer together in the rear sections of the boiler than in the front, thus securing the effect of a second pass without changing the direction of flow from the horizontal. Steel baffles close the upper space between the inside tubes and prevent the gases short circuiting the heating surfaces.

An inverted type of superheater is best adapted to this boiler to prevent dust from collecting on the headers, and the location of this superheater can be varied according to the degree of superheat needed. The use of an economizer in an installation is often advantageous and is particularly effective when this economizer is arranged for a downward flow of gases.

The simple and easily cleaned hopper is continuous and is divided into sections by means of vertical baffles which prevent the gases from by-passing below the boiler tubes. The boiler is completely enclosed in a steel casing which holds the firebrick and insulating material in place. Expansion and contraction of the tubes and drums are said to have no effect upon the casing, as the entire boiler is supported on the two lower drums, thus the refractory lining is kept intact and air infiltration is eliminated.

The methods used to precipitate dust, the manufacturer states, are particularly effective. According to the manufacturer boilers of this type have operated for eight months in cement mills with so little dust collection on the tubes that no increase in the draft loss could be measured with the usual gages.

Convertible Power Shovel

THE KEYSTONE DRILLER CO., Beaver Falls, Penn., announces a new convertible power shovel, Model 17, full revolving and full crawler mounted, equipped with all standard excavating buckets and attachments. The machine weighs 28 tons complete with clamshell, and 30 tons with the standard bank shovel.

Stability has been obtained by mounting the machine on very large roller path, 71 in. in diameter, with hold down shoes which tie the upper structure to the crawlers. This, the manufacturer explains, reduces the tendency to oscillation.

The 21-ft. boom provides horizontal crowding movement of 14 ft. 9 in. so that the bucket can be filled in a 4 or 6 in. cut at one scoop. This, it is said, makes it especially adaptable for shallow excavation.

The power unit is a Climax "Blue Streak" gasoline engine developing 81 hp. at 960 r.p.m. The traction speed is 75 ft. per min., and the revolving speed 5½ r.p.m.

Full revolving and full crawler mounted shovel

New Fine Crusher

THE Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has developed the No. 248 fine crusher, built to meet operating conditions that are not obtainable in other types of Allis-Chalmers jaw crushers.

The manufacturers state that with the new crusher it is possible, within certain limits of capacity and reduction, to produce in a single operation a finished product that ordinarily could only be obtained by using a primary breaker followed by a finishing machine such as crushing rolls.

A feature of the crusher which is a departure from the design of other types of standard A-C jaw crushers is that it has a single toggle arrangement and no pitman, the swing jaw being mounted on the eccentric shaft from which it receives its reciprocating motion.

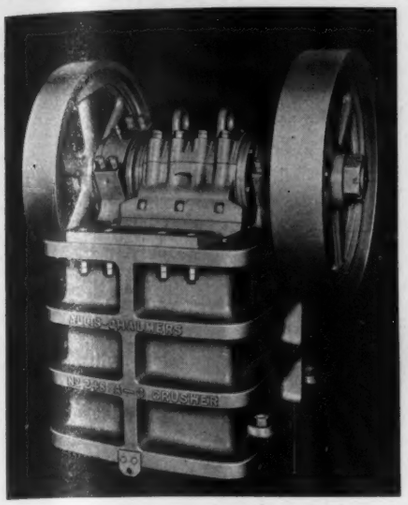
Bearing troubles, it is claimed, have been practically eliminated by the use of roller bearings in the eccentric and frame. The swing jaw is provided with a removable cap which facilitates inspection of roller bearings and also for taking out the eccentric shaft when necessary.

The distance between the jaws, regulating the size of crusher product, is governed by the hand wheel. This adjustment is quickly made by turning the hand wheel and without stopping the machine or changing parts.

There is provided one each tapered wedge and toggle block for adjusting the position of the swing jaw. These blocks are made of cast iron and have tapered faces. The toggle block is supported in the guides which are cast integral with the sides of the frame and the wedge is suspended on the wedge bolt through which the setting of the crusher is regulated by means of the adjusting hand wheel.

The eccentric shaft, made of open-hearth

steel, is 6½ in. in diameter at the center, 5⅞ in. diameter in swing jaw bearings and 4¾ in. diameter in frame bearings. It is turned all over and extended on both sides of the frame to carry the flywheel pulleys.



Fine crusher of new design

It is threaded on both ends to accommodate a hexagon nut which when jammed up tight against pulley hub locks the roller bearing assembly to prevent turning on the shaft. Each frame bearing is fitted with two roller bearings and the eccentric shaft has four roller bearings in the swing jaw.

The frame of this machine is made of semi-steel, and it is a one-piece casting having heavy outer ribs, being designed to stand the heavy strains and shocks that occur in this type of machine.

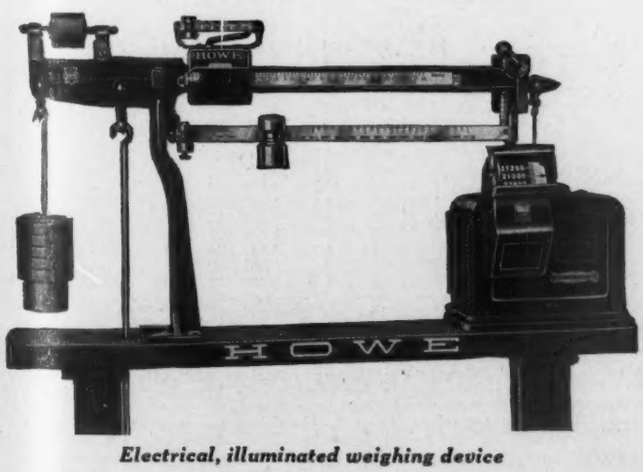
New Weighing Device

THE Howe Scale Co., Rutland, Vt., has developed the "Weightograph," claimed to be the only electrical, illuminated, indicating device on the market.

The device employs the principle of optical magnification for projecting the operation of the scale instead of mechanical multiplication. Much the same as moving pictures are enlarged and projected on a screen, so it is explained the Weightograph magnifies the movement of the weigh beams by means of a precision chart. Intricate mechanisms are done away with—there are no racks-and-pinions, gears, friction discs, compensating cams, weighing springs or other devices in the new weighing device.

The Weightograph may be attached to any beam scale from the small warehouse or dormant type up to a railroad track scale, and when attached makes an automatic out of an old-fashioned beam scale. Dial scales are also convertible to Weightograph operation by merely removing the dial head, the remainder of the scale being retained.

In addition to the attachable Model 1700, the Weightograph is also built as a complete scale, Models 1500 and 1600, having two platform sizes, 18 in. by 20 in. and 25 in. by 25 in., respectively. Both models are built in three modifications; bench type, with tall column, and with counter-height legs. Capacities range from 50 lb. with ½-oz. graduations to 800 lb. with ½-lb. graduations.



Electrical, illuminated weighing device

New Coal Feeder For Lime Kilns

THE ACCOMPANYING illustration shows a new coal feeder for use with a grate, developed by Arnold and Weigel, Inc., Woodville, Ohio.

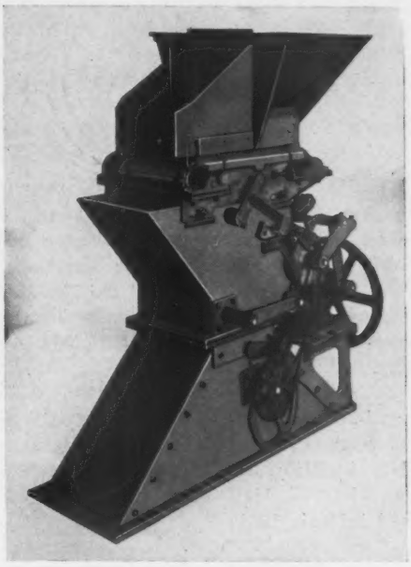
The installation of this feeder is simple, and according to the manufacturer it can be adapted to any kind of lime kiln, the only changes in the fire box being the construction of an arch containing three definite channels, through which the coal is directed to the various parts of the fuel bed.

The entire mechanism is operated by a ½-hp. motor, and the process consists in bringing the coal from an overhead supply hopper to a chamber below, the bottom of which is essentially an endless metal conveyor, the speed of this conveyor and the regulation of a gate in this chamber providing a means for coal regulation as desired.

The coal falling from the end of the conveyor enters a chamber directly below, which has a movable side and bottom, and after a predetermined time interval during which any desired amount of coal can be collected, this movable side and bottom is mechanically opened by a timing device, and the coal is dropped upon a deflecting plate which first dumps the coal on to the left side of the fuel bed through the left hand channel in the arch of the firing box.

The entire process is then repeated, only the deflecting plate is in a vertical position and after the predetermined time the desired amount of coal is dumped into the central channel. After this operation is completed the deflecting plate is shifted to the right, and again after the predetermined time interval, the measured amount of coal is deflected to the right. This completes one cycle, and this same procedure then establishes the routine of operation.

By this means states the manufacturer,



Coal feeder for use with grate

the coal is evenly spread, the volatile materials form a continuous gas supply, and the resulting coke is burned completely to a soft ash. Flame temperature and length of flame in calcining zone of the kiln are definitely controlled, and it is not necessary to open kiln doors for the firing, thus eliminating intake of cold air.

Welding Rods

THE Amsco manganese steel welding rod was developed by the American Manganese Steel Co., Chicago Heights, Ill., several years ago, and according to the company it has shown remarkable performance records.

The manganese content of this rod is from 13½ to 14%, and this, together with other elements, it is claimed, gives a deposit (with the electric arc-welder) equal in toughness and wear resistance to manganese steel.

It may be used for repairing or building up either manganese steel castings or other steels, and it is stocked in A. S. & W. gage No. 5 (0.207 in.), 36 in. long.

For hard-surfacing the company has developed the Amsco 459 welding rod, a cast-rod about 5/16 in. round. It is claimed to be more resistant to abrasion than certain hard-surfacing materials and costs the user considerably less. It is recommended for hard-surfacing dipper-teeth, pulverizer hammers and other parts subjected to severe wearing action.

Toledo, Ohio, Harbor Master to Enter Gravel Business

HIS RESIGNATION as harbor master at Toledo, Ohio, taking effect April 1, C. E. LaBeau will devote his entire time to the interests of the Monroe Sand and Gravel Co., Monroe's (Mich.) newest industry. Mr. LaBeau has had a long and interesting carrier on the lakes, including tug boating, package freight handling, submarine work in raising and salvaging boats and in laying pipes and bridge piling and lately as master of boats and harbors. He had charge of the revamping of the Cherry street bridge in Toledo recently.

The Monroe Sand and Gravel Co. will deal in lake sand and gravel on a wholesale basis and Mr. LaBeau expects to be able to handle 500 tons a day if the demand warrants. Sales will be made to local contractors for road and building work and carload shipments will be made to Detroit, Toledo and other lake cities. This activity will be the first regular commercial use of the Monroe port in many years.

To handle that amount of sand Mr. LaBeau will use the latest type of sand bins and sand dredge. One carload of steel for the erection of the bins has been delivered on the site chosen by the company.

The new company has taken a five year lease from the Consolidated Paper Co. for a strip of land 800 ft. long and averaging 100 ft. wide with rail trackage. The land is on the south side of the River Basin at the extreme end of Front Street, almost due north of the east end of the paper storage warehouse of the Consolidated Paper Co.

The company will use the sucker type of sand dredge and has secured tentative permission of Junior D. McCoach, army district supervising engineer, to do some necessary channel dredging which will be in line with the expected requirements of the proposed Monroe port. The dredge will draw only 7 ft. of water and will easily be able to reach the docks of the company. The dredge will wash and grade the sand and gravel on the boat and the two large clam shells will store the material directly into the bins ready for disposal.

1930 Gasoline Tax Collections Set High Mark

PRELIMINARY ESTIMATES of gasoline tax collection by states in 1930 show that these collections reached a new high total of $522,110,961, an increase of $73,927,712 over the 1929 total and $203,709,405 over the 1928 total. The collection represents an income of around $1,400,000 a day.

The percentage gain of the 1930 gasoline tax income was about 17% over that of 1929 as compared with gains of 47% in 1929; 14% in 1928; 39% in 1927, 29% in 1926, 88% in 1925, 117% in 1924, 204% in 1923 and 157% in 1922.

All States Impose Taxes

All states now impose gasoline taxes, the rate ranging from 2c per gal. to 6c. The average tax collected for the country as a whole is close to 4c.

These figures are compiled by the American Petroleum Institute from gasoline tax collection reports. They do not include taxes collected by counties and municipalities. It is thought the final report of the bureau of public roads, giving net collections, may reduce the total somewhat.

California again led the states in amount collected, with a 3c tax rate. Ohio was again second, with a 4c tax. Texas replaced Pennsylvania for third place, both having 4c collections. Illinois ranked fifth with a 3c rate. New York with a 2c tax was sixth. Michigan was seventh, having a 3c tax. All these states ranked above $20,000,000 each in totals collected.

Revenue Lower in Three States

Only three states sustained reduced revenue in 1930 as in 1929 on the same tax rates. These were Alabama, Arkansas and Mississippi. Motorists in Alabama and Mississippi actually paid more than the total indicates due to the prevalence of local taxes in those states.

In Alabama, Louisiana, Mississippi, Missouri and Florida, where political subdivisions levy taxes of their own, the total tax rate substantially is increased. Thus while the Louisiana state tax is now 5c a gal., New Orleans and several parishes collect an additional tax, making the total 6c. Harrison county, Mississippi, levies a 2c "privilege" tax, making the total 7c.

The average tax for the country as a whole, about 4c, corresponds roughly to the current refinery gasoline price.

Table Shows Rates, Collections

Following is a table showing gasoline tax collections and tax rates by states:

GASOLINE TAX COLLECTIONS AND RATES OVER A THREE-YEAR PERIOD

State	1930	Tax rate, per gal.	1929	Tax rate, per gal.	1928	Tax rate, per gal.
Alabama	$ 6,901,474	4	$ 7,104,215	4	$ 6,731,043	4
Arizona	2,718,613	4	2,559,831	4	2,018,200	4
Arkansas	6,292,599	5	6,730,347	5	5,959,200	5
California	39,988,920	3	37,559,713	3	33,042,095	3
Colorado	6,834,509	4	5,795,713	4	4,260,394	3
Connecticut	4,464,897	2	4,059,072	2	3,468,752	2
Delaware	1,549,622	3	977,231	3	831,180	3
Dist. of Columbia	1,589,383	2	1,437,760	2	1,270,589	2
Florida	13,860,900	6	12,207,375	6	11,345,200	5
Georgia	13,389,672	6	10,263,711	6	8,245,487	4
Idaho	3,003,302*	4–5	2,205,085	4	2,005,800	4
Illinois	28,611,552	3	11,897,682*	3	.....	2–0¶
Indiana	18,668,432	4	16,431,543	4	11,653,961	3
Iowa	11,793,462	3	10,068,831	3	9,199,546	3
Kansas	11,565,814	3	10,177,541	3	6,313,420	2
Kentucky	8,410,595	5	7,733,736	5	6,741,800	5
Louisiana	7,533,599†	4–5	6,925,304	4	3,380,931	2
Maine	4,344,823	4	3,834,331	4	3,289,120	4
Maryland	6,965,877	4	6,532,418	4	5,734,979	4
Massachusetts	10,740,318	2	9,888,730	2	.....	0
Michigan	23,783,308	3	23,558,374	3	20,200,050	3
Minnesota	10,359,111	3	8,898,048	3	5,768,101	2
Mississippi	6,761,980	5	6,805,754	5	5,277,418*	4–5
Missouri	8,818,513	2	7,805,384	2	7,100,013	2
Montana	4,146,605	5	3,790,745	5	2,228,155	3
Nebraska	9,137,828	4	7,861,243	4	3,968,921	2
Nevada	1,167,615	4	712,507	4	575,120	4
New Hampshire	2,596,766	4	2,332,913	4	1,929,400	4
New Jersey	11,373,959‡	2–3	9,996,104	2	8,448,241	2
New Mexico	2,733,005	5	2,421,882	5	1,839,650	5
New York	$29,437,697	2	$19,777,075†	2	.....	0
North Carolina	12,533,453	5	11,983,262	5	9,843,480	4
North Dakota	3,601,042	3	3,150,284	3	2,343,380	2
Ohio	38,802,460	4	34,082,187	4	24,885,700	3
Oklahoma	11,575,203	4	10,929,287	4	8,423,430	3
Oregon	6,774,473	4	4,888,885	4	4,308,417	3
Pennsylvania	32,006,868¶	4–3	35,038,619	4	22,770,819	3
Rhode Island	1,792,003	2	1,571,811	2	1,317,440	2
South Carolina	7,783,773	6	6,978,419	6	5,496,913	5
South Dakota	5,514,636	4	4,930,590	4	4,426,080	4
Tennessee	10,762,234	5	9,315,636	5	5,119,740	3
Texas	32,052,442	4	22,180,083	4	17,724,400†	2–3
Utah	2,104,912	3½	1,979,212	3½	1,667,190	3½
Vermont	1,880,321	4	1,703,091	4	1,119,360	3
Virginia	11,425,980	5	10,509,946	5	9,037,077‡	4½–5
Washington	8,132,105	3	6,442,430	3	4,540,860	2
West Virginia	5,602,146	4	4,955,974	4	4,453,783	4
Wisconsin	8,757,555	2	7,867,900	2	7,142,920	2
Wyoming	1,464,605	4	1,325,435	4	953,801	3
Total	$522,110,967		$448,183,249		$318,401,566	

1928—*Mississippi tax rate raised December 1. †Texas tax rate raised September 1. ‡Virginia tax rate raised March 19. ¶Illinois tax law held unconstitutional February 24; January collections, $885,331.

1929—*Illinois tax effective five months only from August 1. †New York tax rate effective eight months only from May 1.

1930—*Idaho tax raised March 1. †Louisiana tax rate raised November 27. ‡New Jersey tax rate raised December 1. ¶Pennsylvania tax rate reduced July 1.

New Indiana Gravel Co.

THE TIPTON-HAMILTON GRAVEL CORP. has filed articles of incorporation with the secretary of state, the articles setting out that the purpose of the organization is to operate pits and sell gravel therefrom.

The incorporators are W. W. Mount, C. M. Martz, H. C. Haskett, N. R. Lebo, I. H. Woodruff, Walter Carter and C. W. Mount, all of Tipton, Ind.

The organization has a capital stock of 1000 shares with a par value of $10 each.

This organization will develop what is known as the Overdorf pit and others they may locate in Tipton and Hamilton counties.—*Noblesville* (Ind.) *Ledger.*

Prices Bid and Contracts Awarded

Oklahoma City, Okla.—A new figure in the cement price-breaking game in Oklahoma appeared April 14 when the Lehigh Portland Cement Co., a nonresident, cut prices 5 to 25 c. per bbl. to underbid six other companies for the cement contracts, bids for which were opened by the State Highway Commission. Bids were asked on the 800,000 bbl. which were the subject of court litigation and legislative investigation.

The Lehigh company asked for only 500,000 bbl. of the contract. On 10 different destination points its bid was well below the other companies, the Oklahoma, Dewey Consolidated, Universal-Atlas, Lone Star and Monarch, with the exception that the Oklahoma company was low at Ada.

The new low bids were approximately 15c. under the bids of March 9 which were tied up by court injunction and about 30c. under the bids of February 3, which were rejected when the U. S. Bureau of Public Roads refused to approve a contract with the Oklahoma and the Monarch companies.

It is understood all bids carried the protective clause against rise and fall of market and also provided the privilege of the state to buy 25% more or less than the 800,000 bbl. asked.—*Tulsa* (Okla.) *World.*

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Elsberry, Mo.—A contract for supplying 20,000 cu. yd. of rip-rap for Mississippi river work between Hannibal and Hamburg, Mo., was let to the Brandon quarry in Hannibal at $1.08 per cu. yd. and a contract for 40,000 cu. yd. to be used between Hamburg and Grafton, Ill., was let to Paul Harder, of Golden Eagle, for 95c. per cu. yd. The usual price paid for rock at this place is $1.35 per cu. yd.—*Louisiana* (Mo.) *Press Journal.*

* * * * *

Tiffin, Ohio.—Dolomite, Inc., operators of the Maple Grove, Ohio, quarries, were awarded the contract to supply the city with 5000 tons, more or less, of stone and sand for use by the city service department this year. The Dolomite bid of 99c. per ton, was the lowest of three bids submitted.

The contract this year is let at a rate 46c. lower than the $1.45 paid last year.

The county commissioners have also received bids for furnishing stone for county road improvements which varied greatly.

The France Stone Co. made a bid of $1.00 per ton at its Bascom and Bloomville, Ohio, quarries.

The Higgins Co., which has a quarry at Bellevue, Ohio, also bid $1.00.

Dolomite, Inc., made a bid of 80c. per ton on all sizes except No. 7 and 50c. per ton on No. 7, f.o.b. at the plant.

The National Lime & Stone Co., which has quarries in Crawford county and at Carey, Ohio, bid 80c. per ton on sizes 1, 2, 3 and 34; 90c. on sizes 4, 6 and 46, and 75c. for size 7.

No contract is being awarded by the board and stone will be purchased on the basis of those prices where it can be done advantageously.—*Tiffin* (Ohio) *Advertiser.*

* * * * *

Trenton, N. J.—Four New Jersey plants were awarded contracts at $2.14 a barrel for cement by the State Highway Department, April 15. They were favored among nine bids, the unsuccessful companies not having depots in this state. The companies are the Alpha, Edison, Vulcanite and Lawrence.

With the two discounts aggregating 50c. delivered, the actual price of cement to the state is $1.64.—*Newark* (N. J.) *Star-Eagle.*

* * * * *

Battle Creek, Mich.—The city's shopping for low prices in a demoralized cement market ended April 9 when R. J. Corlett and Sons won the 1931 contract.

The winner's bid, $1.69 per bbl., is 74c. below the price which the city paid last year for cement.

City officials were jubilant over the result of their shopping for better bids. The first bids received over a month ago were rejected because the two lowest bidders failed to conform with requirements set up by the city. The lowest bid was $2.28.

In the meantime the cement market began to go to pieces. With cement demand falling off the mills began to cut prices, so the commission decided to wait a while to watch developments. When bids were asked again, two weeks ago, the replies were much more satisfactory from the city's viewpoint, the lowest being $1.92 per bbl. It came to the ears of the officials, however, that still lower prices were available, so the second batch of bids was rejected, and the dealers given until April 9 to get in new ones.

While the price of cement under the new contract awarded is $1.69, the actual cost per barrel is only $1.19 due to discounts and 10c. allowed on each sack returned. Figuring the cost of last year's 29,000 bbl. program at this record low price gives a total cost of $34,500, compared to $55,970 spent last year after reduction of discounts.—*Battle Creek* (Mich.) *Enquirer-News.*

* * * * *

Syracuse, N. Y.—Contracts for cement to be used in highway construction were signed April 14 by Oliver S. Cane, county purchasing agent, at the lowest price in 20 years.

Mr. Cane had intended to award the contract April 10, but he received information that a drop of 4c. per bbl. was due. Subtracted from the previous low quotation of $2.31 per bbl. for cement delivered at Jamesville, that meant a price of $2.27 for the bulk of the county's cement. The Alpha Portland Cement Co. got the contract.

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Memphis, Tenn.—Contracts on practically all of the annual supplies for the city engineering department, for which bids were received recently, were awarded by the city commission April 7.

John A. Denies Sons Co. won the contract for crushed stone at $1.99 per ton.

All bids on cementing road gravel were 50c. a ton, but the contract went to the Camden Gravel Co.

All bids on screened gravel were $1.55 a ton, on concrete gravel $1.15 a ton, on torpedo sand $1.05 a ton, and on sand 95c. a ton. The orders will be divided equally between the Wittichen Lime and Cement Co., the Memphis Lime and Cement Co., John A. Denies Sons Co., the Wolf River Sand and Gravel Co., the Missouri Portland Cement Co., the Central Sand and Gravel Co. and the Fant and Anderson Co.

* * * * *

Springfield, Ill.—Five million barrels of portland cement were purchased by the Illinois department of public works and buildings on April 6 for road and bridge construction in 1931. Contracts were awarded on the third set of bids, two sets have been rejected, and the price finally obtained saved the state $2,250,000 under the price paid last year, it was announced.

Awards were as follows:

Marquette Cement Manufacturing Co., Oglesby, Ill., 1,500,000 bbl.

Lehigh Portland Cement Co., Oglesby, Ill., 500,000 bbl.

Alpha Portland Cement Co., LaSalle, Ill., 400,000 bbl.

Medusa Portland Cement Co., Dixon, Ill., 500,000 bbl.

Universal-Atlas Cement Co., Buffington, Ind., and Hannibal, Mo., 900,000 bbl.

Dewey Portland Cement Co., Davenport, Ia., 275,000 bbl.

Missouri Portland Cement Co., St. Louis, 275,000 bbl.

Lone Star Cement Co., Limedale, Ind., 650,000 bbl.

In commenting on the above awards, H. H. Cleaveland, director of the department of public works and buildings, said:

"It will be noted that 650,000 bbl. of cement have been awarded to the Lone Star Cement Co. This company submitted the lowest bids in 49 counties of the state at prices ranging from 2 to 18c. per bbl. lower than those submitted by any other company. However, since the quantity offered by this company is limited to 650,000 bbl., the department will allocate this cement to the counties in which the greatest saving from this low bid would result, and computations show that the bid of this company will save the state $113,460."—*Moline* (Ill.) *Dispatch.*

* * * * *

Madison, Wis.—Operation of the Manitowoc Portland Cement Co. plant at Manitowoc has been assured for another year by the award of a 528,833 bbl. contract with the state, the Wisconsin Highway Commission announced recently. Three other companies receiving part of the state's 1,370,856 bbl. order were the Lehigh Portland Cement Co., 612,233 bbl.; Petosky Portland Cement Co., 134,783 bbl., and Marquette Cement Manufacturing Co., 95,007 bbl.

News of All the Industry

New Incorporations

Texas Sand and Gravel Co., Waco, Tex., increased capital stock from $75,000 to $120,000.

Pacific Gypsum Co., Portland, Ore., $250,000. A. B. Myers, R. E. Hendricks and L. H. Myers.

San Jose Cement Co., Ltd., Wilmington, Del., $18,250,000.

Limerock Asphalt Co., Louisville, Ky., $25,000. H. C. Showalter, H. J. Russell and Joseph M. Hayes.

San Marcos Gravel Co., Inc., San Marcos, Tex., $50,000. Dan S. Harston, T. J. Christal and J. B. Frazier.

Consumers Gravel Co., Inc., New Orleans, La., $30,000. Wm. L. Stevens, 1017 Peniston St., New Orleans, and Roland A. Thomas.

Aerocrete Products and Construction Material Co., Chicago, Ill., increased capital stock from $50,000 to $500,000.

Consumers Building Material Supply Co., Inc., Milwaukee, Wis., 250 shares at $100 each. G. Zimmerman, H. Hohensee and J. Hohensee. To deal in cement, lime, plaster, etc.

Concrete Construction Co., Inc., Norfolk, Va., $50,000. W. B. Griffin, president, Norfolk, Va. To produce and deal in concrete, cement, lime, plaster, etc.

Parry Rock and Sand Co., Inc., West Palm Beach, Fla. V. D. Stone, Harvey Bldg., West Palm Beach, T. H. Parry, and G. Lewis. To produce rock, sand, cement, etc.

Concrete Materials Corp., Ft. Wayne, Ind., 2500 shares of no par value. M. P. O'Connor, I. L. Asbury, R. L. Magee, E. R. O'Connor and P. M. McNagny.

Armore Clay Corp., Brazil, Ind., 1000 shares of no par value. J. C. Hutchinson, John T. Hutchinson and Hamlet Brosius. To produce and sell clay and cement products.

Quarry Products Co., Menasha, Wis., $60,000, consisting of 300 shares preferred at $100 each and 300 shares common at $100 each. Alfred G. Peterson, Clarence H. Peterson, Harold W. Peterson, Lars H. Wahl and William Peterson.

Buckley Sand and Gravel Co., 160 N. LaSalle St., Chicago, Ill., $50,000. Raymond Pregenzer, James A. Buckley and H. J. Voss. To produce sand, gravel, stone, etc.

Stone Specialties Corp., Cleveland, Ohio, 1250 Class A and B shares of no par value. H. R. McCann, Charles Rinaldo and Ernest Cornell, 1162 Union Trust Bldg., Cleveland, Ohio.

Quarries

Vern and Wilbur Schild, Waverly, Iowa, have signed a 3-year lease to operate the Colburn limestone quarry north of Waverly, specializing in agricultural limestone.

Huntsville Stone Co., Huntsville, Tex., Charles D. Whiteman of Nacogdoches, owner, has leased the old rock quarry of Gibbs Bros., and will resume operations.

Tyrone Lime and Stone Co., Tyrone, Penn., has bought the Sterling Limestone Co., Tyrone, and has also taken over the Tyrone Fuel and Supply Co., Tyrone.

John T. Dyer Quarry Co., Norristown, Penn., has issued a folder telling of the advantages of trap rock for surfacing roads. The folder emphasizes the durability of the material and convincing photographs are used to illustrate this.

H. L. Leas has contracted to reopen the quarry, at one time owned and operated by the railroad company, at Monona, Iowa, to furnish commercial crushed stone and agricultural limestone. The stone is reported to be 94.7% calcium carbonate.

Sand and Gravel

Albany Sand and Gravel Co., Albany, Ore., recently added a new gasoline caterpillar-mounted shovel to its operations.

Monessen Sand and Gravel Co., Monessen, Penn.: State Construction Co. is erecting its asphalt-mixing plant adjacent to the gravel plant.

Independent Sand and Gravel Co., Wheeling W. Va., has let a contract to the Dravo Contracting Co., Neville Island, Pittsburgh, Penn., for two deck-type sand and gravel barges. The barges will be 100 ft. long, 26 ft. wide and 6.6 ft. deep.

Ironton Gravel Co., Ironton, Ohio: Creditors have filed a motion in United States district court for an order setting aside a recent court order which provided for the operation of the plant under a receiver.

United Sand and Gravel Co., and the **Buck Hill Sand and Gravel Co.**, near Canton, Ohio, are reported to have been visited by burglars. In both instances attempts to open the safes were unsuccessful.

H. E. Millen, manager of the Douds Stone Company, and **W. C. Osborn** of Keosauqua, Iowa, are reported to have been prospecting for sand and gravel near Farmington, Iowa, with the intention of building a plant if suitable material is found.

Cumberland River Sand Co., Carthage, Tenn., according to local newspaper reports, is now shipping from 30 to 50 cars of sand and gravel per day and anticipates good business for the next three months. Hunter Young is in charge of sales.

California Rock Co., Centerville, Calif.: The board of directors met recently to wind up the affairs of the company. P. C. Hansen is president; Frank Dusterberry, vice-president; Geo. Clark, secretary; Mrs. Fairbarns, assistant secretary; J. W. Fitting, Charles Hoppe, H. R. Connor and Ralph Lane, directors.

Construction Materials Corp., Chicago, Ill.: David E. Shanahan was elected chairman of the board, and W. H. Gerhauser, president, of the American Shipbuilding Co., and R. B. Chittenden, secretary of the company, were added to the board of directors. Effective May 1, Richard F. McCarthy, now treasurer, becomes vice-president and Mr. Chittenden becomes secretary and treasurer.

Grant County Gravel and Sand Co., Marion, Ind., C. A. Engle receiver, has been sold to F. L. Deer of Franklin, Ind., subject to the approval of the judge of the circuit court. Spirited bidding at the foreclosure sale by bankers and former stockholders in the company was reported. The assets sold for $12,501. Mr. Deer is a member of the firm of D.A.Y. Construction Co., and it is reported that he plans to operate the plant. Its sale gives creditors of the sand and gravel company approximately 25c on the dollar.

Silica Sand

Silica Products Co., Harrison, Ark., D. D. Dunkin, president, will build a new silica sand plant at Everton, about 15 miles from Harrison. It is reported the initial plant will have a capacity of approximately 300 tons a day.

Industrial Chemical Sales Co., Inc., New York City, has issued an interesting 8-page folder on "Ayr Syl" diatomaceous silica in connection with its use for improving the workability of portland cement mixtures. The bulletin is illustrated with microphotographs of diatoms from the Fairhaven beds of Maryland, and it is presumed that it is the Maryland deposits that it is proposed to use for this purpose.

Philadelphia Quartz Co., Philadelphia, Penn., celebrated by a dinner on January 26, at which approximately 200 people were present, the 100th anniversary of its founding. William T. Elkinton, chairman of the board of directors, is the grandson of the founder of the company, Joseph Elkinton. An interesting feature of the dinner was a tableau which contrasted the business office of Joseph Elkinton in 1831 with the present offices of the company. Each individual associated with the company was the recipient of a telechron clock as a token of good will and appreciation from the executive staff.

Slag

Weirton Steel Co., Wheeling, W. Va., is reported working day and night to complete the construction of its new $35,000 crushed slag plant at Holliday's Cove. The new plant will be on the spur line of the Pennsylvania railroad.

Lime

Crogan and Martin, Gays Mills, Wis., has purchased the lime business of Ed Sparks.

Gypsum

Universal Gypsum and Lime Co., Chicago, Ill., has leased the entire 22nd floor of the Loop Center building at the southwest corner of Clark and Madison streets and has taken possession as of April 15. The present offices of the company are in the Conway building, corner of Clark and Washington.

Cement

Pennsylvania-Dixie Cement Corp. is reported to have sublet its offices on the 30th floor of the Lefcourt National Bldg., at 521 5th Ave., New York City, and will move to new offices in the Lincoln Bldg., at 60 East 42nd St.

Century Cement Corp., manufacturers of masonry cement at Rosendale, N. Y., has moved its executive offices in New York City from 103 Park Ave. to the 7th floor of 22 East 40th St.

Dewey Portland Cement Co., Davenport, Iowa, calls attention to the error on page 100 of ROCK PRODUCTS, April 11, in which it was stated an accident occurred at the plant of the Dewey Portland Cement Co., Independence, Mo. Obviously, this should have read "Missouri Portland Cement Co., Independence, Mo.," as the Dewey company has no plant in Missouri.

Cement Products

Atlas Cement Co., Aitkin, Minn., is enlarging its plant to make larger reinforced culvert pipe for highway work. W. F. Murphy is manager.

W. E. Womble and Sons, Ft. Smith, Ark., is building a plant for the manufacture of concrete fence posts, at 1500 May St., Ft. Smith.

Miscellaneous Rock Products

Celotex Co. has purchased the Red Island pumice deposit southeast of Salton Sea, Calif., and will erect a mill on the site. This is near El Centro, Calif.

Paul E. Williams, 14 Wall St., New York City, Herman Cornell, Philtower Bldg., and M. S. Williams, Jr., both of Tulsa, Okla., are reported to be interested in the development of a barite mine and to be contemplating the expenditure of $200,000 for mining equipment.

Lick Ridge Mining Co., Bakersville, N. C., is reported to have leased the Old Lick Ridge feldspar and mica mine from W. Vance Brown of Asheville, and E. C. Guy of Newland. The company is reported to have already begun operations at the mine which is 3 miles east of Bakersville. The company has recently completed a graded road to the mine which is approximately 5000 ft. above sea level. It is said the Southern Feldspar Co. of Toecane, N. C., will handle the entire output of feldspar, and W. Vance Brown will handle the mica sales.

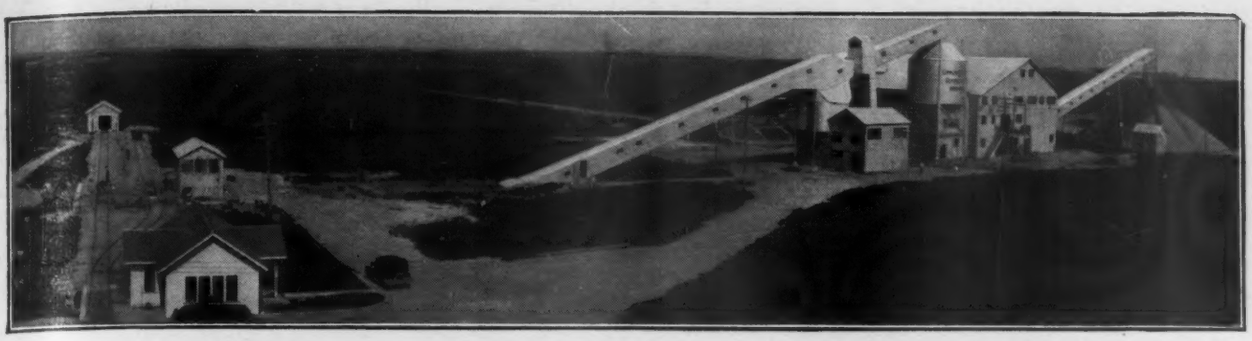
Thermax Corp., manufacturers of magnesite wood fiber wallboard at Chewelah, Wash., has moved its general offices to 228 N. La Salle St., Chicago, and announces the inauguration of a nation-wide campaign to acquaint building material dealers and the public with the use of its material. Thermax wallboard will be represented and stocked in all principal market centers of the country, according to the announcement. This material was described in ROCK PRODUCTS, October 25, 1930 (page 63), and is used for both exterior and interior walls of frame buildings and as an interior wall material in higher class buildings.

Personals

H. B. Springer of the Pennsylvania-Dixie Cement Corp., has been promoted to the position of manager of contract sales with headquarters in New York. Clark P. Brown succeeds him as district sales manager in charge of the Philadelphia, Penn., sales office.

C. H. Ellison, Jr., has resigned from the engineering staff of the South Carolina State Highway Department to join the sales organization of the Lone Star Cement Co., Alabama, with headquarters at Atlanta, Ga.

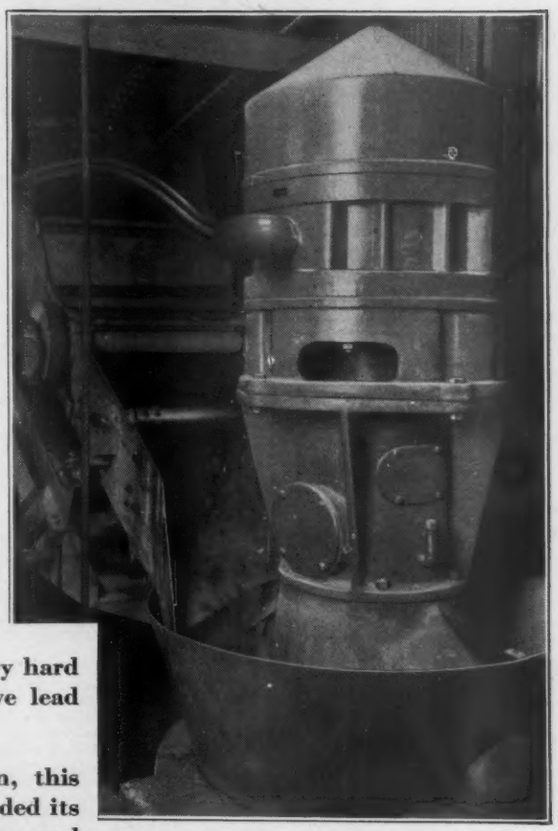
Guy C. Blackmore, of the Northwestern States



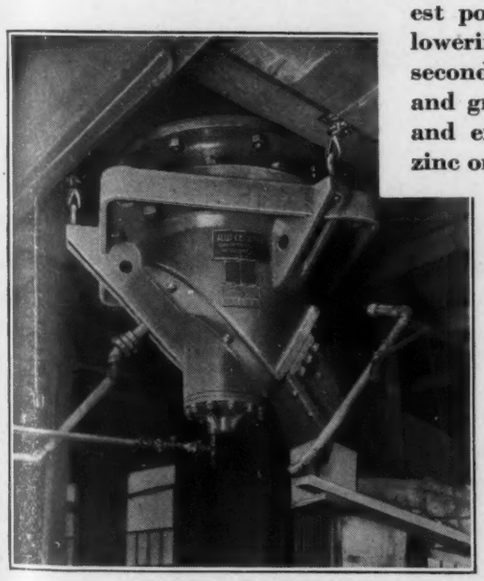
Bird Dog Mill of Commerce Mining & Royalty Company, Miami, Oklahoma

Newhouse Crushers

lower cost of ore reduction



The new "Bird Dog Mill" of the Commerce Mining and Royalty Company, Miami, Oklahoma, was designed to meet present market conditions which demand the lowest possible operating cost. In designing this mill the Commerce engineers selected a 7″ style "B" Newhouse crusher as having the greatest possibilities for lowering the cost of secondary crushing and grinding their very hard and extremely abrasive lead zinc ore.



Readily Accessible

In operation, this mill has exceeded its rated capacity, and the maintenance cost and power requirements for the Newhouse crusher have been low. The photographs of the crusher will indicate the simplicity of the installation and its accessibility.

A leaflet giving a complete description of the "Bird Dog Mill" and a bulletin on the style "B" Newhouse crusher will be sent on request. If you are building a new plant or modernizing an old one let an Allis-Chalmers engineer show you what this crusher will do.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

When writing advertisers, please mention ROCK PRODUCTS

Portland Cement Co., recently addressed the Y's Men's Club of Mason City, Iowa, on the manufacturing process of portland cement, with special reference to the operations of his own company at Mason City.

Sewell L. Avery, president of the United States Gypsum Co., Chicago, Ill., has been elected a director of the Container Corp.

R. E. J. Summers, recently vice-president and contract manager of the H. K. Ferguson Co., Cleveland, Ohio, has resigned to become president of Summers Engineers and Constructors, Inc., with offices in the Terminal Tower Bldg., Cleveland, and in the Graybar Bldg., New York City. Mr. Summers has specialized in connection with the design of earthquake resisting construction and in the design and construction of industrial and commercial buildings of all kinds.

Walter L. Flory and **W. L. White, Jr.,** have been elected directors of the Medusa Portland Cement Co., to succeed L. E. Geer and Frederic Pickford.

Edwin T. Hall has been appointed manager of the Boston office of the Sullivan Machinery Co., Chicago, Ill., to succeed the late George H. Richey. Mr. Hall has been associated with Mr. Richey in the New England sales district for the past 15 years.

Francis Buckingham, who for the past 18 years has been engaged in designing and selling testing machines and equipment, is now associated with the Baldwin-Southwark Corp., Philadelphia, Penn., as sales engineer of testing machinery and equipment.

Frank R. Bacon, former chairman, has been elected president of Cutler-Hammer, Inc., Milwaukee, Wis., succeeding H. L. Worden, deceased. The office of chairman was abolished. The other officers were reappointed.

Charles O. Hutchins has resigned from the Wyoming Sand and Stone Co., Wilkes-Barre, Penn.

Obituaries

George H. Richey, manager of the Boston office of the Sullivan Machinery Co., died April 1 as the result of an accident. Mr. Richey had been a member of the Sullivan organization since 1912 and manager of its New England sales offices in Boston since 1919.

James Frame, widely known quarryman of Berlin, Wis., died April 7 at his home in Milwaukee. Mr. Frame was born in Scotland in 1862 and went to Berlin 38 years ago. Until three years ago, he operated quarries in that locality.

David S. Brewster, Chicago, Ill., sales manager for Trojan Powder Co., died April 11. He was born in Boonville, Mo., Oct. 10, 1859, and entered the powder business with E. I. du Pont de Nemours and Co. many years ago. For the past 20 years he had been with the Trojan Powder Co.

William J. Mathews, city sales manager at Detroit for the Peerless Portland Cement Co., died April 4. He was born in 1882 at Stratford, Ont., and went to Port Huron, Mich., as a boy, eventually becoming sales manager of the Engine Thresher Co. there. Later he joined the Egyptian Portland Cement Co. as a salesman.

Robert S. Nelson, a partner in the Art Stone Co., Davenport, Iowa, died April 1 at his home in Rock Island, Ill. He was formerly a mason contractor and came to this country from Sweden at the age of 4 years.

Manufacturers

Marion Steam Shovel Co., Marion, Ohio, will manufacture all steam shovels to be used on the $100,000,000 Boulder dam project, officials have announced.

Reliance Electric and Engineering Co., Cleveland, Ohio, manufacturer of electric motors, announces the advancement of W. C. Suerken to sales representative in its New York office and Robert M. Fitzgerald to sales representative in Philadelphia.

George D. Whitcomb Co., Rochelle, Ill.: Formal notices have been issued relative to the creditors' sale of bankrupt property of the company by the western division of the United States district court for the northern district of Illinois. All company property will be sold.

Meriam Co., Cleveland, Ohio, manufacturer of flow meters, draft gages, manometers and pulsation shock absorbers for pressure gages, announces the appointment of Mayer and Oswald, 332 S. La Salle St., Chicago, as representatives in the Chicago territory.

Morse Chain Co., Ithaca, N. Y., subsidiary of Borg-Warner Corp., Detroit, Mich., announces the appointment of R. W. Appleton as purchasing agent at Ithaca. He was formerly director of purchases of Pierce Arrow Motor Car Co.

Barber-Greene Co., Aurora, Ill., announce several changes in their sales organization. E. H. Cooper, formerly Kansas City manager, is now western division ditcher line head. He operates with J. M. Bruns, head of the eastern division. Kansas City territory has been divided between Kenney Machinery Co., Kansas City, Mo., and the Buda Engine Service, Tulsa, Okla. Frank Ness, formerly of the Boston Office, is now Philadelphia manager, and D. H. McLean, formerly Detroit manager, is now Cleveland manager.

Harnischfeger Sales Corp., Milwaukee, Wis., announces that after April 27 its New York office will be in the Empire State building.

Chain Belt Co., Milwaukee, Wis., has moved its Buffalo, N. Y., office to 1807 Elmwood Ave. T. E. Cocker is the district manager in charge of the Buffalo office.

Bay City Shovels, Inc., Bay City, Mich., has moved its eastern office to 9 Westefield Ave., W., Roselle Park, N. J.

Traylor Engineering and Manufacturing Co., Allentown, Penn., announces the new location of its New York office, in charge of R. R. Shafter, as Room 2513, Empire State Bldg.

Foote Bros. Gear and Machine Co., Chicago, Ill., announces the removal of its general offices to 215 North Curtis St., Chicago.

Link-Belt Co., Chicago, Ill., elected three additional members to the board of directors at the stockholders' meeting held April 8. No changes were made in the old directorate. The new members are Arthur L. Livermore, attorney, New York City; George P. Torrence, vice-president of the company, in charge of the Indianapolis plant; and Richard W. Yerkes, secretary and treasurer of the company. Mr. Torrence joined the Link-Belt Co. in 1911 and Mr. Yerkes in 1890.

American Steel and Wire Co., Chicago, Ill., announces C. F. Wiley is appointed manager of sales, electrical and wire rope department, Chicago, to fill vacancy caused by death of C. S. Knight; A. H. Mowry is appointed manager of sales, electrical and wire rope department, New York, to fill the vacancy caused by promotion of John May; H. D. Sharp, manager of the electrical and wire rope department of Boston, has been transferred to Worcester, under Mr. May, in charge of these and Worcester specialties in New England district.

Ingersoll-Rand Co., New York, recently received an order for seven 55-ton oil-electric locomotives from the Bush Terminal Co. for use in switching service. Each locomotive is powered with an Ingersoll-Rand 300-hp. railroad type Diesel engine. General Electric Co. will supply all electrical equipment. During the past five years it is said nearly 100 of these locomotives have been placed in service in the United States.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Cranes. The February-March issue, **Vol 1, No. 1,** of "Crane Service News," has made its appearance. It is folio size broadside of rotogravure pictures of mobile crane operations, published by the CRANE SERVICE ASSOCIATION, Lorain, Ohio.

Explosives. No. 1, Vol. 2, the January, 1931, issue of "Explosives Progress," a monthly publication. The issue features the use of explosives in blasting ice jams. INSTITUTE OF MAKERS OF EXPLOSIVES, 103 Park Ave., New York City.

Rotary Kilns. Bulletin describing the important features of Traylor rotary kilns, such as the self-contained single-roller support, which, it is claimed, makes an easy job of setting up and aligning the kiln shell, and the special fully-enclosed, dustproof and oil-tight speed reducer which eliminates the old-fashioned gear train. TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

Induction Motors. Induction motors for power plant auxiliaries is the subject of a new 8-page leaflet. This leaflet, **No. 20439,** lists the power plant auxiliaries usually driven by induction motors and gives the type of induction motor best suited for each. A large number of installation photographs are used to illustrate the leaflet. WESTINGHOUSE ELECTRIC AND MANUFACTURING CO., East Pittsburgh, Penn.

Cable Power Scraper. A new bulletin has been issued which describes and illustrates various parts of the equipment together with pictures of installations. A chart for the selection of the proper sized equipment with required horsepower is included. This is especially designed for the storage of bulk materials. ATLAS CONVEYOR CO., Philadelphia, Penn.

Perforated Plates for Vibrating Screens. Booklet on perforated plates for vibrating screens in double corrugated square and rectangular mesh. According to the manufacturer, this double corrugating prevents material from sliding over the plate at too fast a speed for good screening and at the same time rolls, tumbles and sifts the particles and also spreads them over the entire surface of the plate. HENDRICK MANUFACTURING CO., Carbondale, Penn.

Compressors. Bulletin **No. 102,** describing various types of compressors, and expaining the Pennsylvania method of "Dual Compressor Control," a method of regulation by which the compressor can be operated to take care of either the maximum or minimum demand (continuous operation for maximum demand and automatic stop and start for minimum demand), and which it is claimed results in lowered power consumption with a corresponding reduction in the cost of power and elimination of wear on the compressor during unloaded periods. PENNSYLVANIA PUMP AND COMPRESSOR CO., Easton, Penn.

Excavators. Bulletin **No. FBE-10301,** covering the new 1030 ¾-yd. machine, convertible into clamshell, lifting crane, shovel, dragline and drag shovel. According to the description this new machine is built to handle hard digging, and every moving part is designed for quick response, easy control and long life. Bulletin **No. B-521,** introducing the new 2¼-yd. 52-B Diesel shovel-dragline-clamshell-crane, new features of which include a six-cylinder, slow-speed, Atlas-Imperial, full-Diesel engine, improved steering, oversize mountings, arrangements for shipping without dismantling, etc. Illustrated. BUCYRUS-ERIE CO., South Milwaukee, Wis.

Handling Wire Rope. In "Wire Engineering" for March, 1931, **Vol. 1, No. 5,** there is a very pointed article on the right and wrong way to handle wire rope. Particular emphasis is placed upon the initial uncoiling from the maker's reel at point of installation. Many wire ropes are permanently damaged by kinking in the first unreeling. Reels should always be mounted on a mechanical device for unhindered rotation. JOHN A. ROEBLING'S SONS CO., Trenton, N. J.

Gyratory Crushers. Announcement is made by a circular that Bulletin **3100** on Bulldog gyratory crushers will be sent to those interested by TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

OWNERSHIP OF ROCK PRODUCTS

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of ROCK PRODUCTS, published every second Saturday at 542 South Dearborn street, Chicago, Ill., for April 1, 1931. State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared Nathan C. Rockwood, who, having been duly sworn according to law, deposes and says that he is the manager of ROCK PRODUCTS, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corp.; Editor, Nathan C. Rockwood; Managing Editor, None; Business Manager, Nathan C. Rockwood.

2. That the owner is Tradepress Publishing Corp., Chicago, Ill., and that the stockholders holding 1% or more of the total amount of stock are: W. D. Callender, Nathan C. Rockwood, both of 542 South Dearborn street, Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

NATHAN C. ROCKWOOD.
Business Manager.

Sworn to and subscribed before me this 7th day of April, 1931.

(SEAL) CHARLES O. NELSON.

(My commission expires May 27, 1934.)

On punishing crusher drives use this shock-proof Goodyear belt

WHEN your crushers chew into a tight glut of rock it's good to have Goodyear Belting on the job. Goodyear Thor Belts are made for the belt-smashing shocks of intermittent crusher loads. The heavy silver-duck plies are stoutly cushioned and buttressed with high-strength rubber. It is strong at the fasteners — a shock-proof drive belt to save costs on punishing drives.

Goodyear Transmission Belting with all other Goodyear Mechanical Rubber Goods—Hose, Molded Rubber Goods, and Packing—is accurately applied to your machinery by the G. T. M.— Goodyear Technical Man. His services assure you of proper weight and structure of Conveyor and Elevator Belting. He brings you definite economies in the purchase of Air Hose. To learn of the savings he has achieved for many plants similar to yours, just write to Goodyear, Akron, Ohio, or Los Angeles, California, and ask the G. T. M. to call.

THE GREATEST NAME IN RUBBER

GOODYEAR

BELTS • MOLDED GOODS • HOSE • PACKING

When writing advertisers, please mention ROCK PRODUCTS

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 144

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

Aerial Wire Rope Tramways (See Tramways, Aerial Wire Rope)

Agitators, Thickeners and Slurry Mixers
Hardinge Company
F. L. Smidth & Co.

Air Compressors
Fuller Company
Nordberg Mfg. Co.
Pennsylvania Pump & Compressor Co.
Traylor Eng. & Mfg. Co.
Worthington Pump and Mach. Corp.

Air Filters
Fuller Company

Air Separators
Hardinge Company
Parsons Engineering Corp.
Raymond Bros. Impact Pulv. Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv.

Ash and Refuse Handling Equipment
The Hayward Company
Sprout, Waldron & Co., Inc.

Automatic Weighers
Merrick Scale Mfg. Co.
Richardson Scale Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backfillers
Bucyrus-Erie Company

Back Stops
D. O. James Mfg. Co.

Bagging Machinery
Sprout, Waldron & Co., Inc.
Richardson Scale Co.

Bags
Hammond Bag & Paper Co.

Balls (Grinding)
Lorain Steel Co.

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
Hardinge Company
F. L. Smidth & Co.

Batchers
Blaw-Knox Company
Erie Steel Construction Co. (Aggregate)

Bearings
Link-Belt Company
Sprout, Waldron & Co., Inc.
The Timken Roller Bearing Co.

Bearings (Anti-Friction)
The Timken Roller Bearing Co.

Bearings (Roller)
The Timken Roller Bearing Co.

Bearings (Tapered Roller)
The Timken Roller Bearing Co.

Bearings (Thrust)
The Timken Roller Bearing Co.

Belting (Conveyor and Elevator)
Goodyear Tire & Rubber Co., Inc.
New York Belting & Packing Co.

Belting (Multiple V)
Goodyear Tire & Rubber Co., Inc.

Bins (Cement, etc.)
Blaw-Knox Company
Burrell Eng. & Const. Co.
Erie Steel Construction Co.
Macdonald Eng. Co.
Traylor Eng. & Mfg. Co.

Bin Gates
Easton Car & Construction Co.
Erie Steel Construction Co.
Fuller Company
Industrial Brownhoist Corp.
Link-Belt Co.
McLanahan & Stone Corp.
Richardson Scale Co.
Sprout, Waldron & Co., Inc.
W. Toepfer & Sons Co.
Traylor Eng. & Mfg. Co.

Blast Hole Drills (See Drills, Blast Hole)

Blasting Machines
Illinois Powder Mfg. Co.

Blasting Powder (See Powder Blasting)

Blasting Supplies
Illinois Powder Mfg. Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Company
The Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.
Sauerman Bros.

Boats (Self Unloading)
Leathem D. Smith Dock Co.

Bodies (Motor Truck)
Easton Car & Construction Co.

Boilers
Combustion Engineering Corp.

Breaker Machinery
Vulcan Iron Wks.

Breakers (Primary)
Smith Eng. Wks.
Williams Patent Crusher & Pulv. Co.

Brick Hardening Cylinders
Komnick G. m. b. H.

Brick Machinery
The Deister Concentrator Co.
Komnick G. m. b. H. (Sand-Lime and Slag)

Briquetting Machinery
Vulcan Iron Wks.

Bucket Conveyors (See Conveyors and Elevators)

Buckets (Clamshell) (See Buckets, Grab and Clamshell)

Buckets (Dragline and Slackline)
American Manganese Steel Co.
Bucyrus-Erie Co.
Erie Steel Construction Co.
Sauerman Bros.

Buckets (Electric Clamshell)
Erie Steel Construction Co.

Buckets (Elevator and Conveyor)
Cross Engineering Co.
The Hayward Company
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
The Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Sprout, Waldron & Co., Inc.
W. Toepfer & Sons Co.
Taylor-Wharton Iron & Steel Co.

Buckets (Grab, Clamshell, etc.)
Blaw-Knox Company
Erie Steel Construction Co.
The Hayward Co.
Industrial Brownhoist Corp.
Link-Belt Co.

Buildings (Steel)
Blaw-Knox Company

Bushings (Machined or Processed)
Manganese Steel Forge Co.

Cableways
Broderick & Bascom Rope Co.
General Electric Co.
The Hayward Company
Link-Belt Co.
John A. Roebling's Sons Co.
Sauerman Bros.

Calciners
Vulcan Iron Works

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Illinois Powder Mfg. Co.

Car Pullers
Link-Belt Co.

Cars (Dump)
Davenport Loco. & Mfg. Corp.
Easton Car & Construction Co.

Cars (Quarry and Gravel Pit)
Atlas Car & Mfg. Co.
Davenport Loco. & Mfg. Corp.
Easton Car & Construction Co.

Car Wheels (See Wheels, Car)

Castings
Bethlehem Fdy. & Machine Co.
Davenport Loco. & Mfg. Corp.
Eagle Iron Works (Grey Iron)
Fuller Lehigh Company
Link-Belt Co.
McLanahan & Stone Corp.
The Timken Roller Bearing Co.
Vulcan Iron Works (Iron and Steel)

Cement Making Machinery
F. L. Smidth & Co.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)
Blaw-Knox Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
The Jeffrey Mfg. Co.
Manganese Steel Forge Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Bethlehem Fdy. & Machine Co.
Link-Belt Company

Chain Links (Cold Shut, Repair, etc.)
Bucyrus-Erie Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chimney Construction (New and Repair)
Northwestern Chimney Const. Co.

Chutes and Chute Liners
American Manganese Steel Co.
Cross Engineering Co.
The Frog, Switch & Mfg. Co.
Manganese Steel Forge Co.
McLanahan & Stone Corp.

Chute or Launder Lining
Goodyear Tire & Rubber Co., Inc.

Clamshell Buckets (See Buckets, Grab, Clamshell, etc.)

Clamshell Cranes (See Cranes)

Clarifiers
Hardinge Company

Classifiers
The Deister Concentrator Co.
Deister Machine Co.
Eagle Iron Works (Flume Valve)
Link-Belt Company

Clips (Wire Rope)
Broderick & Bascom Rope Co.

Clutches (Magnetic)
Dings Magnetic Separator Co.

Coal Crushers and Rolls
McLanahan & Stone Corp.
Vulcan Iron Works
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Fuller Lehigh Co.
Hardinge Company
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulverizer Co.

Cocks (Lubricated—Acid Proof)
Merco Nordstrom Valve Co.

Compressed Air Rock Drills
Cleveland Rock Drill Co.

Compressors (See Air Compressors)

Concentrators (Magnetic)
Dings Magnetic Separator Co.

Concentrators (Slurry, etc.)
The Deister Concentrator Co.
The Deister Machine Co.

Concrete Breakers
Cleveland Rock Drill Co.

Contractors and Builders
Burrell Eng. & Const. Co.
E. J. Longyear Co.
Macdonald Eng. Co.

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
Link-Belt Co.
Sprout, Waldron & Co., Inc.

Conveyor Magnets
Dings Magnetic Separator Co.

Conveyors and Elevators
Fuller Company
The Hayward Company
Industrial Brownhoist Corp.
The Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
F. L. Smidth & Co.
Smith Engineering Works
Sprout, Waldron & Co., Inc.
Sturtevant Mill Co.
W. Toepfer & Sons Co.
Traylor Eng. & Mfg. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Bethlehem Fdy. & Machine Co.
Link-Belt Company
Sprout, Waldron & Co., Inc.

Conveyoweighs
Richardson Scale Co.

Coolers (See Kilns and Coolers Rotary)

Core Drilling (See Drills, Diamond Core)

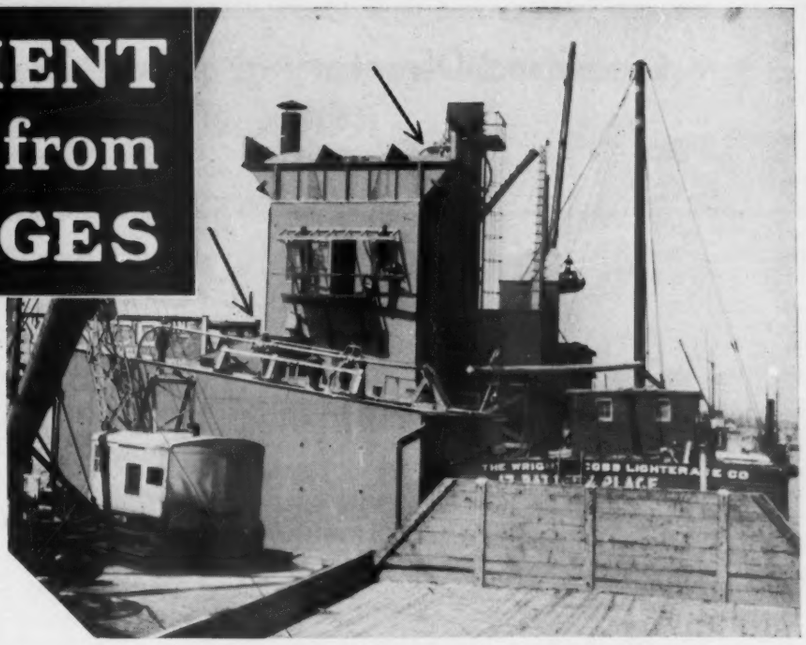
Correcting Basins
F. L. Smidth & Co.

Couplings (Flexible and Shaft)
D. O. James Mfg. Co.
Link-Belt Company

Couplings (Hose, Pipe, etc.)
Cleveland Rock Drill Co.

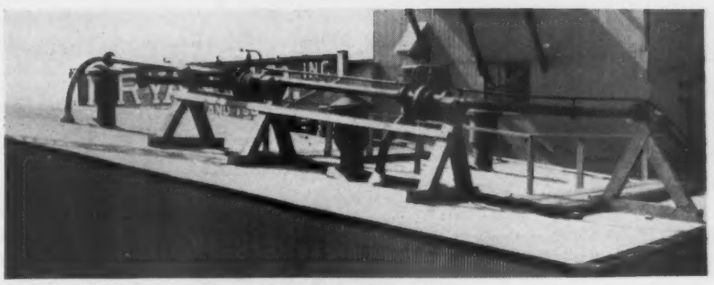
Cranes (Barge)
The Ohio Locomotive Crane Co.

BULK CEMENT pumped from BARGES



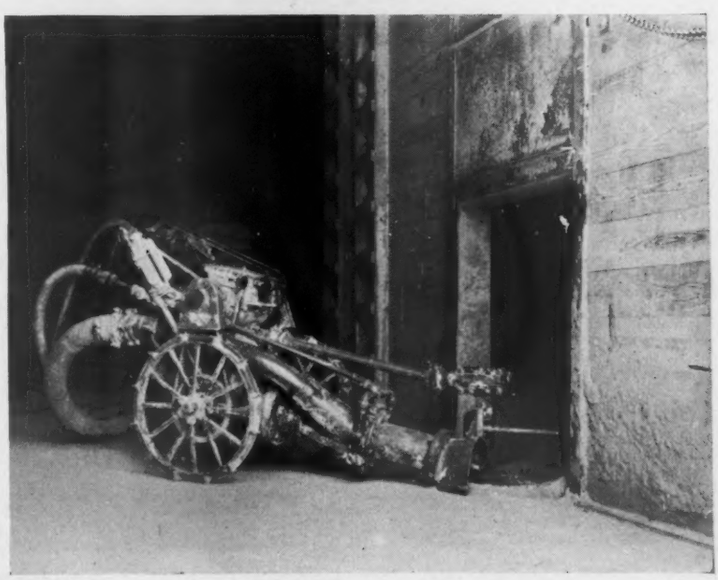
THE FULLER-KINYON SYSTEM conveys bulk cement from ordinary houseboat type barges directly to either of two mixer bins or to any one of three storerooms at this concrete mixing plant. The arrows indicate the branch pipe lines through which the cement is conveyed.

WAREHOUSE STORAGE instead of expensive bin equipment is one of the features of this plant, made practical by this unique conveyor. Three large, flat-bottomed storerooms are available for different cements. Cement is delivered to any room through a valve-controlled branch line. The same line is used to deliver to either mixer bin when cement is recovered from storage.



ONE MAN OPERATES the portable Fuller-Kinyon Pump, and has no difficulty in keeping ahead of the requirements of a 3 yd. mixer. The little physical effort required on the part of the operator and the absence of a dust nuisance makes working conditions most favorable. Air is supplied to this pump from a small, single-stage Fuller Rotary Air Compressor. The Fuller-Kinyon Pump illustrated is suitable for unloading standard box cars and barges at large central mixing plants and for construction service. A smaller machine is available to meet the requirements of highway construction and small mixing plants.

The Fuller Company manufactures a complete line of stationary and portable conveyors for pulverized, crushed and granular materials.



Fuller Company

CATASAUQUA, PENNA., U. S. A.

When writing advertisers, please mention ROCK PRODUCTS

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 144

Cranes, Caterpillar (See Cranes, Crawler and Locomotive)

Cranes (Clamshell)
Bay City Shovels, Inc.
Bucyrus-Erie Co.

Cranes (Crawler and Locomotive)
Atlas Car & Mfg. Co.
Bucyrus-Erie Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Ohio Locomotive Crane Co.
Thew Shovel Co. (Electric, Gasoline and Steam)

Cranes (Gantry)
The Hayward Co.
Industrial Brownhoist Corp.

Cranes (Overhead Traveling Electric)
Erie Steel Construction Co.
Industrial Brownhoist Corp.

Crusher Parts (Manganese)
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Crusher Protectors
Dings Magnetic Separator Co.

Crushers (Hammer)
Pennsylvania Crusher Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulverizer Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
James H. Beans Fdy. Co.
C. G. Buchanan Co., Inc.
Nordberg Mfg. Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Oscillating)
James H. Beans Fdy. Co.

Crushers (Roll)
James H. Beans Fdy. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Rotary)
James H. Beans Fdy. Co.

Crushers (Single Roll)
The Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
C. G. Buchanan Co., Inc.
Fuller Lehigh Company
The Jeffrey Mfg. Co.
McLanahan & Stone Corp.
Sturtevant Mill Co.
Traylor Eng. & Mfg. Co.

Cutter (Traveling Chain Ladder Type Suction Nozzle)
Eagle Iron Works

Derricks and Derrick Fittings
The Hayward Company

Detonators
Illinois Powder Mfg. Co.

Diamond Core Drilling (See Drills, Diamond Core)

Diesel Engines (See Engines, Diesel)

Dipper Teeth
The Frog, Switch & Mfg. Co.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.
The Hayward Co.
Taylor-Wharton Iron & Steel Co. (Manganese)
Thew Shovel Co.

Ditchers
Bucyrus-Erie Co.
The Hayward Co.

Draglines
Bucyrus-Erie Co.
Link-Belt Co.
Thew Shovel Co.

Dragline Excavators
Bucyrus-Erie Co.
The Hayward Co.
Thew Shovel Co. (Electric Gasoline and Steam)

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros.

Drag Scrapers (See Scrapers, Power Drag)

Drag Shovels
Bucyrus-Erie Co.

Dredge Chain (See Chain)

Dredge Pipe (See Pipe)

Dredges
Bucyrus-Erie Co.
Ellicott Machine Corp. (Sand and Gravel)
The Hayward Company
Morris Machine Works

Drilling Accessories
Cleveland Rock Drill Co
Loomis Machine Co.
Sanderson Cyclone Drill Co.
Worthington Pump and Mach. Corp.

Drill Steel
Cleveland Rock Drill Co.

Drills (Blast Hole)
Loomis Machine Co.
Sanderson Cyclone Drill Co.
Worthington Pump & Mach. Corp.

Drills (Diamond Core)
E. J. Longyear Co.

Drills (Hammer) (See Hammer Drills)

Drills (Rock)
Cleveland Rock Drill Co.

Drills (Well) (See Drills, Blast-Hole)

Drives (Short Center)
Allis-Chalmers Mfg. Co.
Sprout, Waldron & Co., Inc.
Worthington Pump and Mach. Corp.

Drives (Worm)
D. O. James Mfg. Co.

Drums (Magnetic)
Dings Magnetic Separator Co.

Dryers
Allis-Chalmers Mfg. Co.
Combustion Engineering Corp.
Fuller Lehigh Company
McGann Mfg. Co., Inc.
McLanahan & Stone Corp.
Ruggles-Coles Div. of Hardinge Co.
Traylor Eng. & Mfg. Co.
Vulcan Iron Works (Rotary)

Dryers (Cement Slurry)
Filtration Engineers Inc.

Dust Arresters
Pangborn Corp.
Parsons Engineering Corp.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
Pangborn Corp.
Parsons Engineering Corp.

Dust Control
Blaw-Knox Co.
Pangborn Corp.

Dust Conveying Systems
Fuller Company

Dynamite
Illinois Powder Mfg. Co.

Electric Cables and Wires
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
General Electric Co.

Elevator Belting (See Belting)

Elevator Buckets (See Buckets, Elevator)

Elevators (See Conveyors and Elevators)

Emery Mills
Sturtevant Mill Co.

Engineers
Burrell Eng. & Constr. Co.
E. J. Longyear Co.
Macdonald Eng. Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.
R. D. Wood & Co.

Engines (Diesel)
Nordberg Mfg. Co.
Worthington Pump and Machy Corp.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Explosives
Illinois Powder Mfg. Co.
Keith Dunham Co.

Fans
General Electric Co.
Vulcan Iron Works

Fans (Exhaust)
The Jeffrey Mfg. Co.
Pangborn Corp.
Parsons Engineering Corp.

Feeders (Chain)
Ross Screen & Feeder Co.

Feeders (Plate)
Smith Engineering Works

Feeders (Pulverized Coal)
Fuller Lehigh Company
Sprout, Waldron & Co., Inc.

Feeders (Weighing)
Hardinge Company
Schaffer Poidometer Co.

Filter Cloth
Filtration Engineers Inc.
Oliver United Filters Inc.

Filters (Cement Slurry)
Filtration Engineers Inc.
Oliver United Filters Inc.

Flanges (Swivel)
Merco Nordstrom Valve Co.

Forging Furnaces (For Drill Steel)
Worthington Pump and Machy. Corp.

Forgings (Steel)
Davenport Loco. & Mfg. Corp.
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

Frogs and Switches
Atlas Car & Mfg. Co.
Central Frog & Switch Co.
Easton Car & Construction Co
Taylor-Wharton Iron & Steel Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Fuses (Electric)
General Electric Co.

Gaskets
Goodyear Tire & Rubber Co., Inc.

Gas Producers
R. D. Wood & Co.

Gates, Bin (See Bin Gates)

Gears (Herringbone)
D. O. James Mfg. Co.

Gears (Spur, Helical, Worm)
D. O. James Mfg. Co.
The Jeffrey Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Gears and Pinions
Bethlehem Fdy. & Machine Co.
The Frog, Switch & Mfg. Co.
General Electric Co.
D. O. James Mfg. Co.
Link-Belt Co.
Taylor-Wharton Iron & Steel Co.
Vulcan Iron Works

Gear Reducers
D. O. James Mfg. Co.

Gelatin and Semi-Gelatin (See Explosives)

Generators (See Motors and Generators)

Grab Bucket Cranes (See Cranes)

Grab Bucket (Hoists and Monorail) (See Cranes)

Grab Buckets (See Buckets, Grab, Clamshell, etc.)

Grapples
The Hayward Co.

Grating (Steel)
Blaw-Knox Company

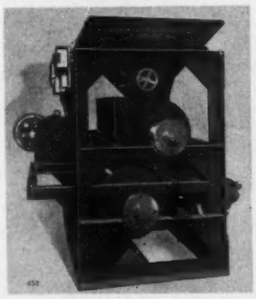
Grease
Merco Nordstrom Valve Co. (Valve)

Grinding Balls
Fuller Lehigh Company
The Jeffrey Mfg. Co.

Grizzlies
American Manganese Steel Co.
Eagle Iron Works
Manganese Steel Forge Co.
Smith Engineering Works
W. Toepfer & Sons Co.
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

The Magnetic Pulley
Get down to details and find out why Dings pulleys outlive those of other makes. It's the greatest crusher protector on the market today.



The Double Drum
a highly efficient machine for feebly magnetic materials.

Rowand-Wetherill Type
for the concentration of ore.

◆

Many Dings Separators have been in operation 23, 24, 25 years. This in itself demonstrates the quality of Dings construction. This is the kind of service that saves money. Remember all separators are not the same.

Dings High Intensity MAGNETIC SEPARATION

The world's largest builders of magnetic separation equipment!

◆

No other manufacturer of similar equipment can offer you such a wealth of experience. Thirty-two years of solving problems dealing with the protection of crushers and grinders and the refining and concentration of ores is yours to draw on. A complete magnetic laboratory is at your service. Here is the help you need on your troublesome iron problems. Why not take advantage of it?

◆

DINGS MAGNETIC SEPARATOR CO.
803 Smith Street, Milwaukee, Wisc.
The world's largest manufacturers of Magnetic Separators

NEW YORK CITY
50 Church Street
ALBANY
90 State Street
CHICAGO
332 South LaSalle Street
SAN FRANCISCO
273 Seventh Street

Branch offices in all principal cities

RP4-25Gray

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Guns (Hydraulic)
Taylor Forge & Pipe Works

Gyrating Screens (See Screens)

Hammer Drills
Cleveland Rock Drill Co.

Hammer Mills (See Crushers)

Heat Treating Machines, Automatic (For Drill Steel)
Worthington Pump and Machy. Corp.

Hoists
The Hayward Co. (Steam, Gasoline & Electric)
Link-Belt Co.
McLanahan & Stone Corp.
Sauerman Bros.
Vulcan Iron works (Electric and Steam)

Hoists, Skip (See Skip Hoists and Skips)

Hoppers and Spouts
Manganese Steel Forge Co.

Hose Couplings (See Couplings, Hose, Pipe)

Hose (Water, Steam, Pneumatic and Air Drill)
Cleveland Rock Drill Co.
Goodyear Tire & Rubber Co., Inc.
New York Belting & Packing Co.

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Blaw-Knox Co.
McGann Mfg. Co., Inc.
Vulcan Iron Works

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Insulation (Electric)
General Electric Co.

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Allis-Chalmers Mfg. Co.
Blaw-Knox Company
Hardinge Company
McGann Mfg. Co., Inc.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Vulcan Iron Works

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Blaw-Knox Co.

Kilns (Shaft)
Hardinge Company
McGann Mfg. Co., Inc.
Vulcan Iron Works

Kominuters (See Mills)

Laboratory Crushers
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Williams Patent Crusher & Pulv. Co.

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Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Hardinge Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.
Sprout, Waldron & Co., Inc.

Lime and Hydrating Plants
Blaw-Knox Company
McGann Mfg. Co., Inc.

Line Shaft Couplings
D. O. James Mfg. Co.

Linings (See Mill Liners and Linings)

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Liquid Oxygen
Keith Dunham Co.

Loaders and Unloaders
Bucyrus-Erie Co.
The Hayward Co.
The Jeffrey Mfg. Co.
Link-Belt Co.

Locomotive Cranes (See Cranes, Crawler & Locomotive)

Locomotives (All Types)
Vulcan Iron Works

Locomotives (Compressed Air)
H. K. Porter Co.

Locomotives (Diesel)
Fate-Root-Heath Co.
Mid-West Locomotive Wks.
Plymouth Locomotive Works

Locomotives (Diesel-Electric)
Fate-Root-Heath Co.
Heisler Locomotive Works
Mid-West Locomotive Works
Plymouth Locomotive Works

Locomotives (Fireless Steam)
H. K. Porter Co.

Locomotives (Gas Electric)
Davenport Loco. & Mfg. Corp.
Fate-Root-Heath Co.
Mid-West Locomotive Works
Plymouth Locomotive Works
H. K. Porter Co.

Locomotives (Gasoline)
H. K. Porter Co.

Locomotives (Geared)
Heisler Locomotive Works
Lima Locomotive Works, Inc.

Locomotives (Oil-Electric)
Davenport Loco. & Mfg. Corp.
Fate-Root-Heath Co.
Heisler Locomotive Works
Mid-West Locomotive Works
Plymouth Locomotive Works
H. K. Porter Co.

Locomotives (Steam, Gas and Electric)
Davenport Loco. & Mfg. Corp.
Fate-Root-Heath Co. (Gas)
General Electric Co.
Heisler Locomotive Works
The Jeffrey Mfg. Co.
Lima Locomotive Works, Inc. (Steam)
Mid-West Locomotive Works
Plymouth Locomotive Works (Gas)
H. K. Porter Co. (Steam)

Locomotives (Storage Battery)
Atlas Car & Mfg. Co.
General Electric Co.
The Jeffrey Mfg. Co.

Log Washer
McLanahan & Stone Corp.
Smith Eng. Wks.

Lubricants
Broderick & Bascom Rope Co. (Wire Rope)
Merco Nordstrom Valve Co. (Valve)

Machinery Guards
Harrington & King Perforating Co.

Magnetic Clutches
Dings Magnetic Separator Co.

Magnetic Pulleys
C. G. Buchanan Co., Inc.
Dings Magnetic Separator Co.

Magnets
General Electric Company

Magnets (Electro)
Dings Magnetic Separator Co.

Magnets (High Intensity)
Dings Magnetic Separator Co.

Magnets (Standard and Special)
Dings Magnetic Separator Co.

Manganese Steel
Manganese Steel Forge Co.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Manganese Steel Parts
American Manganese Steel Co.
Manganese Steel Forge Co.
Taylor-Wharton Iron & Steel Co.

Manganese Welding Rod
Taylor-Wharton Iron & Steel Co.

Metals (Alloys, See Alloys, Babbitt Metal, Manganese Steel, Steel, etc.)

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Bethlehem Fdy. & Machine Co.
Hardinge Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulverizer Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Bethlehem Fdy. & Machine Co.
Fuller Lehigh Company
Hardinge Company
The Jeffrey Mfg. Co.
F. L. Smidth & Co.

Mine Development
E. J. Longyear Co.

Mineral Magnetic Separators
Dings Magnetic Separator Co.

Mining Engineers (See Engineers)

Mixers (Ready Mixed Concrete, See Ready Mixed Concrete)

Motors and Generators (Electric)
Allis-Chalmers Mfg. Co.
General Electric Co.

Nozzles (Gravel Washing)
Binks Mfg. Co.

Ore Jigs
McLanahan & Stone Corp.

Ore Separators
Dings Magnetic Separator Co.

Oxygen Liquid (See Liquid Oxygen)

Packings
Goodyear Tire & Rubber Co., Inc.
New York Belting & Packing Co.

Perforated Metal
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.
Taylor-Wharton Iron & Steel Co. (Manganese)
W. Toepfer & Sons Co.

Pipe
The Frog, Switch & Mfg. Co. (Dredge)
Taylor Forge & Pipe Works
R. D. Wood & Co. (Dredge, etc.)

Pipe Machines, Concrete (Culvert, Drainage, Irrigation, Sewer)
McCracken Machy. Co.

Plug Valves (See Valves)

Pneumatic Drills (See Drills)

Poidometers
Schaffer Poidometer Co.

Portable Conveyors
Fuller Company
Link-Belt Co.

Portable Crushing and Screening Unit
Smith Eng. Wks.
Williams Patent Crusher & Pulv. Co.

Portable Loaders
The Jeffrey Mfg. Co.

Powder (Blasting)
Illinois Powder Mfg. Co.

Pulleys (Magnetic) (See Magnetic Pulleys)

Pulverizer Parts
American Manganese Steel Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Fuller Lehigh Company
Hardinge Company
The Jeffrey Mfg. Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulverizer Co.

Pump Parts
The Frog, Switch & Mfg. Co.

Pumps (Acid, Centrifugal)
Oliver United Filters Inc.

Pumps (Air Lift)
Fuller Co.
Pennsylvania Pump & Compressor Co.
Worthington Pump and Machy. Corp.

Pumps (Cement)
Fuller Company

Pumps (Cement Mill)
Worthington Pump and Mchy. Corp.

Pumps (Cement Slurry)
American Manganese Steel Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

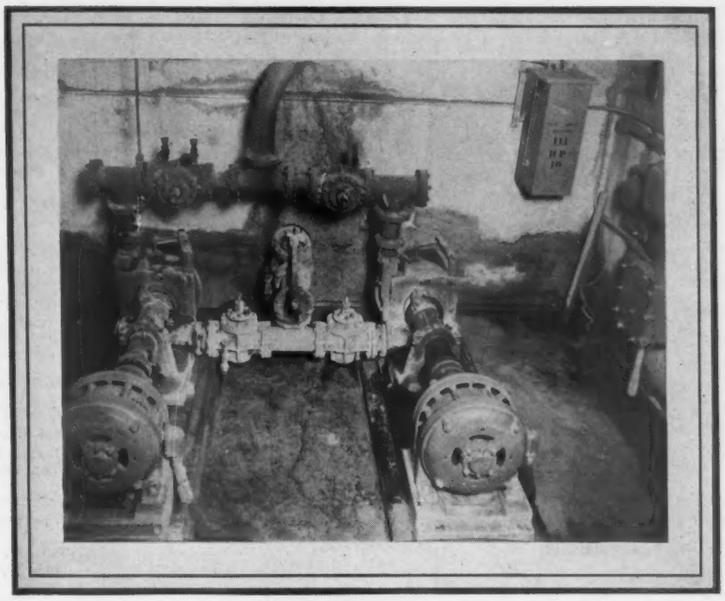
Pumps (Centrifugal)
Allen Cone & Machy. Corp.
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Hetherington & Berner, Inc.
Morris Machine Works
Pennsylvania Pump & Compressor Co.
A. R. Wilfley & Sons
Worthington Pump and Machy. Corp.

Pumps (Drainage)
Worthington Pump and Machy. Corp.

Pumps (Dredging)
Bucyrus-Erie Co.

The Slurry Pump

Preferred by a Large Majority



Use Wilfley Pumps on Closed-Circuit Grinding

Where the practice of closed-circuit grinding is to be installed, operators will find the Wilfley Pump ideally suited for handling these slurries.

MORE than 75% of the wet process mills in the country use the Wilfley Slurry Pump.

They use it because it is ideally suited for handling slurry, bringing to this problem all the advantages of centrifugal pumping.

Certain Wilfley features assure low-cost pumping. There's the absence of the stuffing box; extra-heavy pumping parts; simple take-up of clearances; absence of dilution through gland water; and finally the "quick-change" of pumping parts.

The many wet process mills that use the Wilfley Slurry Pump are justified in their preference. It merits being the choice of every mill.

CENTRIFUGAL WILFLEY PUMPS

A. R. WILFLEY & SONS, Inc.
P. O. Box 2330
DENVER, COLO, U. S. A.

WILFLEY Centrifugal SAND PUMP
PATENTED

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Fuller Lehigh Company

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Hetherington & Berner, Inc.
Morris Machine Works
A. R. Wilfley & Sons

Quarry Development
E. J. Longyear Co.

Rails
Central Frog & Switch Co.
Easton Car & Construction Co.

Railways (Electric)
General Electric Co.

Railway Equipment
Central Frog & Switch Co.
General Electric Co.

Ready Mixed Concrete (Truck Mixer Bodies)
Clinton Motors Corp.

Road Machinery
Industrial Brownhoist Corp.

Rock Drills (See Drills, Rock)

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Worthington Pump and Machy. Corp.

Rod Mills
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Traylor Eng. & Mfg. Co.

Roller Bearings
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Rotary Roasters
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Sand and Gravel Handling Equipment
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Sand Drag
McLanahan & Stone Corp.
Smith Eng. Wks.

Sand Settling Tanks
Allen Cone & Machy. Corp.
Link-Belt Co.
Smith Engineering Works

Scales (Automatic Proportioning)
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Richardson Scale Co.

Scrapers (Power Drag)
The Hayward Co.
Link-Belt Co.
Sauerman Bros.

Screens
Allis-Chalmers Mfg. Co
American Manganese Steel Co
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
The Deister Concentrator Co.
Eagle Iron Works
The Frog, Switch & Mfg. Co.
Hardinge Company
Harrington & King Perf. Co.
Hendrick Mfg. Co.
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The Jeffrey Mfg. Co.
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Morrow Mfg. Co.
John A. Roebling's Sons Co.
Ross Screen & Feeder Co.
Smith Eng. Wks.
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Sturtevant Mill Co.

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W. Toepfer & Sons Co.
Traylor Eng. & Mfg. Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

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Smith Eng. Wks.
Williams Patent Crusher & Pulv. Co.

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Deister Machine Co.
Link-Belt Co.
McLanahan & Stone Corp.
Smith Engineering Works
Sprout, Waldron & Co., Inc.
Sturtevant Mill Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

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McLanahan & Stone Corp.
Smith Eng. Wks.

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Smith Eng. Wks.

Scrubbers (Steel)
McLanahan & Stone Corp.

Seal Rings (Kilns, Coolers and Dryers)
Bethlehem Fdy. & Machine Co.

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Dings Magnetic Separator Co.

Separators (Magnetic)
C. G. Buchanan Co., Inc.
Dings Magnetic Separator Co.

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Dings Magnetic Separator Co.

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F. L. Smidth & Co.

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E. J. Longyear Co.

Shale Removers
Eagle Iron Works

Sharpening Machines, Drill (See Drill Sharpening Machines)

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Vulcan Iron Works

Shovel Repair Parts (Manganese)
Taylor-Wharton Iron & Steel Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bay City Shovels, Inc.
Bucyrus-Erie Company
Industrial Brownhoist Corp.
Link-Belt Co.
Thew Shovel Co. (Crawling Tractor)

Silos
Burrell Eng. & Const. Co.
Macdonald Eng. Co.
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.
Vulcan Iron Works

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John A. Roebling's Sons Co.

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D. O. James Mfg. Co.
Link-Belt Co.

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Taylor-Wharton Iron & Steel Co.

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American Manganese Steel Co.

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Joseph T. Ryerson & Son, Inc.
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Steel (Electric Furnace)
The Timken Roller Bearing Co.

Steel (Open Hearth)
The Timken Roller Bearing Co.

Steel Plate Construction
Hendrick Mfg. Co.

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The Timken Roller Bearing Co.

Steel (Special Analysis)
The Timken Roller Bearing Co.

"Stellited" (Die Rings, etc.)
Bethlehem Fdy. & Machine Co.

Stokers
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Storage Equipment
Sauerman Bros.

Tanks
Combustion Engineering Corp.
Link-Belt Co.

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Hardinge Company

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A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.

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Tunnelling Machines
E. J. Longyear Co.

Turntables
Easton Car & Constr. Co.

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Thew Shovel Co.

Underground Shovels
Nordberg Mfg. Company

Valves
Merco Nordstrom Valve Co. (Lubricated Plug)

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Deister Machine Co.
Eagle Iron Works
Link-Belt Co.
Sprout, Waldron & Co., Inc.
W. Toepfer & Sons Co.
Traylor Eng. & Mfg. Co.

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Water Softening Systems
Deister Machine Co.

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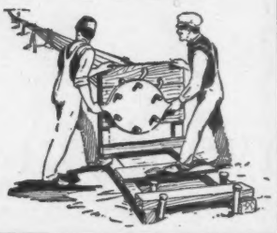
QUARRY CABLES OF 1876



CHAINS and hemp rope were still in wide use on quarry equipment in 1876 when B & B Ropes were first made—by hand. Gallantly, your industry took a chance on our new, untried products.

NOW, for scores of years, Yellow Strand, the super wire rope, has *proved* its stamina, its economy, in quarries everywhere. The world affords none finer than the Swedish stock from which the wire is drawn. And the excellent "staying qualities" of this wire are maintained at the maximum in laying up the rope.

Get Catalog 27

BRODERICK & BASCOM ROPE CO.

ST. LOUIS

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Wire for all B&B Ropes undergoes many important laboratory tests before being laid up into rope.

P18

YELLOW STRAND WIRE ROPE

MADE OF WIRE DRAWN TO OUR SPECIFICATIONS FROM GENUINE SWEDISH STOCK

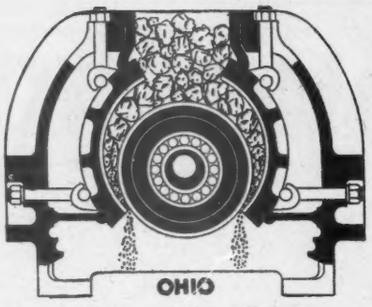
26-year-old Davenport . . . packs four years of hard work into 18 months

A noteworthy performance record was recently hung up by faithful old Davenport Locomotive No. 55, built in 1903. For 18 months it was constantly operated on both day and night shifts by the Phoenix Utility Company at Hot Springs, Arkansas. To many, the ability of this 26-year-old steamer to deliver constant trouble-free performance will be astonishing. To the many users of Davenport Locomotives, however, it will simply reflect the inbuilt stamina and long service life they have come to know and rely upon. * * * More than 30 years of locomotive building has furnished a sound understanding of rail haulage requirements. Davenports are built in sizes from 7 to 70 tons for all track gauges. * * * Don't forget Davenport Rail Dump Cars—they are built to your specifications. * * * Let us work with you toward the most satisfactory solution of your rail haulage problems.

Davenport Locomotive & Manufacturing Corp., Davenport, Iowa

STEAM GASOLINE **DAVENPORT LOCOMOTIVES** GAS-ELECTRIC OIL-ELECTRIC

MAKING GOOD IN THE EAST



ALTHOUGH comparatively new in the field, the superiority of the OHIO principle as applied to crushing is instantly recognized by operators interested in the larger output and lower power costs which the OHIO design offers.

Our illustration shows the OHIO Crusher on the job at the plant of Lattanzio Brothers, Schenectady, New York.

Send for detailed explanation of this most revolutionary of crushing designs.

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MARTINS FERRY, OHIO

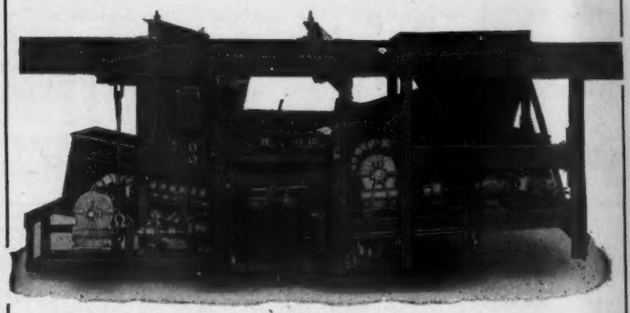
In the Cement Mill
ACCURACY Is of Prime Importance

both in checking production or output and in properly proportioning ingredients for the finished and raw mixes.

1% or 2% is NOT good enough!

The Richardson CONVEYoWEIGH

is *accurate.* Guaranteed to weight within ½ of 1%.



The Richardson CONVEYoWEIGH

is self-testing. It can be stopped at any time to check accuracy—no special weights, testing apparatus, or other scale is needed. Merely press the "stop" button and note the balance of the beam.

No Spoiled Mixes
Accuracy Guaranteed

See our catalog 1629-G for complete description of the Richardson CONVEY-o-WEIGH. Write our nearest branch for a copy.

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Clifton, New Jersey

CHICAGO OMAHA NEW YORK PHILADELPHIA
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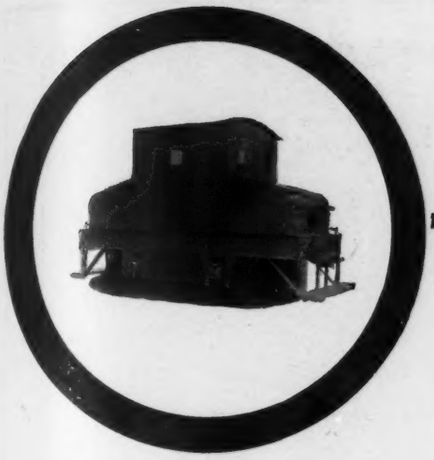

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Cars made by Atlas are rugged and durable. Features of design permit fastest loading and dumping. They remain in service long after they have paid for themselves in faithful performance.

Atlas Locomotives are furnished in a power and gauge for every need.

Atlas cars for every industrial purpose. Write for details

THE ATLAS CAR & MFG. COMPANY
Engineers - - - Manufacturers
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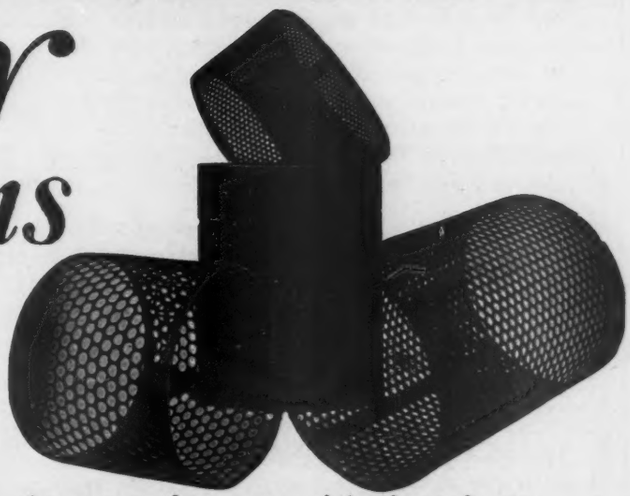
Toepfer screens



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THE Toepfer line offers the type of screen with size of perforations exactly suited for any material screening requirements. Toepfer service is prompt and the screens are made of high carbon steel to assure maximum wear of the screen sections.

Complete information and price quotations will be sent on your requirements. Write.

W. TOEPFER & SONS COMPANY

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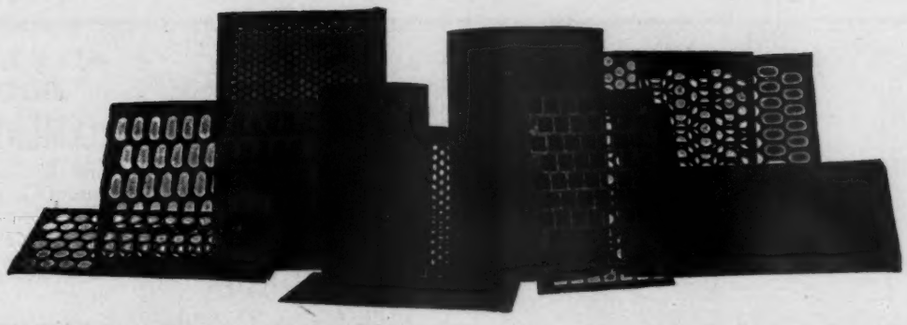

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Special MORROW screens can be made to meet individual specifications.

Let your next screen be the MORROW and you'll never go back to ordinary screens.

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McCRACKEN Concrete Sewer Pipe

—made faster and at lower cost than any other pipe. A manufacturing opportunity for the aggregate producer—an outlet for sizes otherwise hard to dispose of.

The McCracken Machine is the only Dual Packer-Head Pipe machine, trowelling the inside of the bell as well as of the pipe wall. Molds removed from pipe at once—so densely are they packed that they stand without support—no pallets tied up in curing rooms.

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McCRACKEN MACHINERY COMPANY
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Classified Advertisements

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INFORMATION
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CLASSIFIED—Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

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Shovels or Cranes

FOR SALE

1—Factory rebuilt Lima 1¼ cu. yd. capacity. This machine can be equipped with either shovel, clamshell, dragline or drag shovel attachments. Very reasonably priced. Carries new machine guarantee. Located at New York.

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Complete Shovel Attachment for Type "O" Thew, located Buffalo, N. Y. Also, attachment for Type B and B-2 Eries located in New Jersey, Decided bargains.

P & H 1¼ yd. gas shovel. Excellent condition, very attractive price. Located South Kearny, N. J.

1—Linn Tractor, 6-yd. capacity, with Waukesha Motor. Machine in very good condition. Priced to sell quickly. Located New York State.

We have both Steam and Gasoline Excavators ranging from ½ to 1½ cu. yd. capacity in various parts of the country that will be sold at extremely low prices or leased with leased payments made applying on purchase price.

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Lima Trust Bldg.
Tel. Main 4824

Eastern Offices and Warehouse:
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Tel.: Waverly 2—0640

Wire or phone at our expense.

FOR SALE

1—Type B Erie Steam Shovel, 19'-9" Boom, 16' Dipper Handle, ¾ cu. yd. Dipper, on caterpillars, Shop No. 2837, Price $3250.00.

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1—15x36 Universal Jaw Crusher on trucks, without elevator and without screen, first-class condition, Price $1250.00.

1—2F Telsmith Reduction Crusher on skids, with 36' Elevator and 24"x10' Revolving Screen, first-class rebuilt condition, Price $1500.00.

All prices f.o.b. Louisville and subject to prior sale.

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GYRATORY CRUSHERS

42" McCully
No. 8 McCully
No. 7½ McCully
No. 6 McCully

JAW CRUSHERS

8"x14" Cartersville
24"x36" Traylor
24"x36" Farrel
60"x48" Traylor

KILNS

7'x100' Rotary
6'x40' Rotary
7½'x20' Rotary Roaster
6'x125' Steel Stack
(Self-Supporting)
Lot of Steel Tanks

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P. & H. Model 206, ¾-yd. Dragline.
Byers, 10-ton Cater. Crane, ¾-yd. Clam.
O. & S. 22½-ton Loco. Crane, 50' Boom.

CARS

16—12-yd. Western, Steel Beam Dump Cars.
10—50-ton capacity, All Steel Twin Hopper Cars.

LOCOMOTIVES

75-ton, 20x26", 6-Dr. Switcher, A.S.M.E.
50-ton. 18x24", 6-Driver Switcher.
92-ton, 20½x28", Mikado (2-8-2), Built 1922.
35-ton, 13x20", 4-Driver Saddle Tank, A.S.M.E.
56-ton, 18x24", 4-Driver Saddle Tank.

We have over forty locomotives in stock, rebuilt and ready, all types, 10 to 100 tons

Southern Iron & Equipment Co.
Est. 1889 Atlanta, Georgia

IN STOCK

150—24" gauge 2-way Western and Austin dump cars, one and one and one-half yard capacity, in good serviceable secondhand condition. Also a number of new "V" shaped dump cars, 24" gauge; rails, new and relaying and all sorts of tracks supplies of all sections. Also gasoline locomotives, 24" and 36" gauge and batch box cars in good serviceable condition, as well as portable track to go with same.

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They're going fast! Had 84, only have 36 left. Model "WS" series four cylinder, 80, 100, and 120 H.P., 900 R.P.M. Industrial type, guaranteed like new. Price $950.00 each, cost new $2700.00.

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MERTES MACHINERY COMPANY
1622 So. First St. Milwaukee, Wis.

FOR SALE

2—36"x54", 30x42 Buchanan Jaw Crushers.
6—36"x24", 36x18, 36x15, 30x15, 30x13, 24x15, 24x13 Farrel Jaw Crushers.
3—36"x28", 36x24 Traylor Jaw Crushers.
30—Gyratory Crushers, 42" McCully, 30" McCully, 10-K Gates, No. 10 Austin, 9-K Gates, No. 8 Gates, No. 8 McCully, No. 8 Kennedy, No. 7½ Kennedy, No. 7½ Gates, 16" Traylor, 14" NEW Allis-Chalmers and all smaller sizes.
15—Fine Reduction Crushers—2-F Telsmith; 8" McCully, Traylor; 7" Newhouse; 10" McCully; Nos. 25, 37 Kennedy; 48" Vertical Symons Disc.
12—Rotary Screens—4x12, 4x16, 4x20 Gates A-C; 40x14, 4x12 Telsmith, etc.
7—Crushing Rolls, 16x10, 20x14, 36x16.
2—18", 24" Single Roll Crushers.
8—Vibrating Screens—Rotap, No. 27, 31, 37, 39, No. 60 Tyler; 2x4' Niagara; 3x8 Universal, 3x6 Leahy.
3—6'x22", 6'x30" Hardinge Ball Mills.
3—5 roll Raymond High-Low Side Mills.
1—1¼ yd. Lorain Shovel, Gas. Cat. 1928, Mfr. now rebuilding.

All sizes and types Jaw, Gyratory and Roll Crushers, Swing Hammer Mills, Elevators, Belt Conveyors, Rotary and Vibrating Screens, Rotary Kilns and Dryers, Raymond and other fine Pulverizers, Air Separators, Hardinge Ball and Pebble Mills, silex and iron lined Tube Mills, Shovels and Cranes, etc. Send for Bulletin No. 12.

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2—Electric single drum Hoists, drum dia. 48" x 60" with 75 and 150 H.P. A.C. motors.
30—2 yd. all steel Kopple Cars 30" gauge.
6—Farrel, Buchanan and Traylor 18 x 36 and 24 x 36 Jaw Crushers.
2—Farrel and Buchanan 30 x 42 and 36 x 42 Jaw Crushers.
1—Telsmith 20" all steel Gyratory Crusher.
1—Symons 3 ft. Cone Crusher.
1—Telsmith size 40 Reduction Crusher.
1—Traylor 8" Reduction Crusher.
1—Traylor 12" Gyratory Crusher.
1—Set Traylor Crushing Rolls 36" dia. x 16" face.
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12—Centrifugal Pumps direct to A.C. Motors 2 stage and four stage, capacity 400 G.P.M. at 275' to 700' head.

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2—12 Ton Plymouth.
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30—4 yard & 5 yard Dump Cars. K & J, Koppel, Western.
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34—4-yd. steel stone skips, ½" plate, 1½ x 4 bands.

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600 Model P&H. 1-yard dipper.

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25-ton Browning 8-wheel 2-line, 50' boom.
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LOCOMOTIVES

55-ton 17x24" Vulcan 4-wheel saddle tank, Ohio standard boiler.
21-ton 11x16" Vulcan 4-wheel sadde tank, National Board boiler. (Two duplicate.)
50-ton 16x2"4 American 4-wheel saddle tank.

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70—4 yard Western Heavy Duty, steel underframe, 36" gauge.
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2—78-C Bucyrus Steam Shovels mounted on Caterpillars, 2½ yard bucket, first-class operating condition, ready for immediate shipment.
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Rails, Equipment, Machinery, Oil Engines, Piling, Tanks, Pipe, etc.

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[Contributed by ROCK PRODUCTS, for the good of the cause at the suggestion of Frederick M. Feiker, Managing Director of The Associated Business Papers and Member of American Trade Association Executives.]

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POSITION WANTED TO LOWER SALES cost. A young man, age 31, with nine years experience in the industrial field as Advertising and Sales Promotion Manager, desires a position handling Trade Journal Advertising—Direct Mail—Dealer and educational advertising—Help for the salesmen in the field. I have been associated with a large manufacturer of haulage equipment, locomotives and gasoline engines, producing very definite results in selling with a profit at a minimum of cost. I will place before you references and a detailed account of past experiences. Write to Lawrence H. Cornelius, 3812 Monroe Street, Chicago, Ill.

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☐ Sand & Gravel	☐ Phosphate
☐ Glass Sand	☐ Cement
☐ Lime	☐ Slate
☐ Sand-Lime Brick	☐ Talc

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INDEX TO ADVERTISEMENTS

Portland Cement Co., recently addressed the Y's Men's Club of Mason City, Iowa, on the manufacturing process of portland cement, with special reference to the operations of his own company at Mason City.

Sewell L. Avery, president of the United States Gypsum Co., Chicago, Ill., has been elected a director of the Container Corp.

R. E. J. Summers, recently vice-president and contract manager of the H. K. Ferguson Co., Cleveland, Ohio, has resigned to become president of Summers Engineers and Constructors, Inc., with offices in the Terminal Tower Bldg., Cleveland, and in the Graybar Bldg., New York City. Mr. Summers has specialized in connection with the design of earthquake resisting construction and in the design and construction of industrial and commercial buildings of all kinds.

Walter L. Flory and **W. L. White, Jr.**, have been elected directors of the Medusa Portland Cement Co., to succeed L. E. Geer and Frederic Pickford.

Edwin T. Hall has been appointed manager of the Boston office of the Sullivan Machinery Co., Chicago, Ill., to succeed the late George H. Richey. Mr. Hall has been associated with Mr. Richey in the New England sales district for the past 15 years.

Francis Buckingham, who for the past 18 years has been engaged in designing and selling testing machines and equipment, is now associated with the Baldwin-Southwark Corp., Philadelphia, Penn., as sales engineer of testing machinery and equipment.

Frank R. Bacon, former chairman, has been elected president of Cutler-Hammer, Inc., Milwaukee, Wis., succeeding H. L. Worden, deceased. The office of chairman was abolished. The other officers were reappointed.

Charles O. Hutchins has resigned from the Wyoming Sand and Stone Co., Wilkes-Barre, Penn.

Obituaries

George H. Richey, manager of the Boston office of the Sullivan Machinery Co., died April 1 as the result of an accident. Mr. Richey had been a member of the Sullivan organization since 1912 and manager of its New England sales offices in Boston since 1919.

James Frame, widely known quarryman of Berlin, Wis., died April 7 at his home in Milwaukee. Mr. Frame was born in Scotland in 1862 and went to Berlin 38 years ago. Until three years ago, he operated quarries in that locality.

David S. Brewster, Chicago, Ill., sales manager for Trojan Powder Co., died April 11. He was born in Boonville, Mo., Oct. 10, 1859, and entered the powder business with E. I. du Pont de Nemours and Co. many years ago. For the past 20 years he had been with the Trojan Powder Co.

William J. Mathews, city sales manager at Detroit for the Peerless Portland Cement Co., died April 4. He was born in 1882 at Stratford, Ont., and went to Port Huron, Mich., as a boy, eventually becoming sales manager of the Engine Thresher Co. there. Later he joined the Egyptian Portland Cement Co. as a salesman.

Robert S. Nelson, a partner in the Art Stone Co., Davenport, Iowa, died April 1 at his home in Rock Island, Ill. He was formerly a mason contractor and came to this country from Sweden at the age of 4 years.

Manufacturers

Marion Steam Shovel Co., Marion, Ohio, will manufacture all steam shovels to be used on the $100,000,000 Boulder dam project, officials have announced.

Reliance Electric and Engineering Co., Cleveland, Ohio, manufacturer of electric motors, announces the advancement of W. C. Suerken to sales representative in its New York office and Robert M. Fitzgerald to sales representative in Philadelphia.

George D. Whitcomb Co., Rochelle, Ill.: Formal notices have been issued relative to the creditors' sale of bankrupt property of the company by the western division of the United States district court for the northern district of Illinois. All company property will be sold.

Meriam Co., Cleveland, Ohio, manufacturer of flow meters, draft gages, manometers and pulsation shock absorbers for pressure gages, announces the appointment of Mayer and Oswald, 332 S. La Salle St., Chicago, as representatives in the Chicago territory.

Morse Chain Co., Ithaca, N. Y., subsidiary of Borg-Warner Corp., Detroit, Mich., announces the appointment of R. W. Appleton as purchasing agent at Ithaca. He was formerly director of purchases of Pierce Arrow Motor Car Co.

Barber-Greene Co., Aurora, Ill., announce several changes in their sales organization. E. H. Cooper, formerly Kansas City manager, is now western division dicsher line head. He operates with J. M. Bruns head of the eastern division. Kansas City territory has been divided between Kenney Machinery Co., Kansas City, Mo., and the Buda Engine Service, Tulsa, Okla. Frank Ness, formerly of the Boston Office, is now Philadelphia manager, and D. H. McLean, formerly Detroit manager, is now Cleveland manager.

Harnischfeger Sales Corp., Milwaukee, Wis., announces that after April 27 its New York office will be in the Empire State building.

Chain Belt Co., Milwaukee, Wis., has moved its Buffalo, N. Y., office to 1807 Elmwood Ave. T. E. Cocker is the district manager in charge of the Buffalo office.

Bay City Shovels, Inc., Bay City, Mich., has moved its eastern office to 9 Westefield Ave., W., Roselle Park, N. J.

Traylor Engineering and Manufacturing Co., Allentown, Penn., announces the new location of its New York office, in charge of F. R. Shafter, as Room 2513, Empire State Bldg.

Foote Bros. Gear and Machine Co., Chicago, Ill., announces the removal of its general offices to 215 North Curtis St., Chicago.

Link-Belt Co., Chicago, Ill., elected three additional members to the board of directors at the stockholders' meeting held April 8. No changes were made in the old directorate. The new members are Arthur L. Livermore, attorney, New York City; George P. Torrence, vice-president of the company, in charge of the Indianapolis plant; and Richard W. Yerkes, secretary and treasurer of the company. Mr. Torrence joined the Link-Belt Co. in 1911 and Mr. Yerkes in 1890.

American Steel and Wire Co., Chicago, Ill., announces C. F. Wiley is appointed manager of sales, electrical and wire rope department, Chicago, to fill vacancy caused by death of C. S. Knight; A. H. Mowry is appointed manager of sales, electrical and wire rope department, New York, to fill the vacancy caused by promotion of John May; H. D. Sharp, manager of the electrical and wire rope department of Boston, has been transferred to Worcester, under Mr. May, in charge of these and Worcester specialties in New England district.

Ingersoll-Rand Co., New York, recently received an order for seven 55-ton oil-electric locomotives from the Bush Terminal Co. for use in switching service. Each locomotive is powered with an Ingersoll-Rand 300-hp. railroad type Diesel engine. General Electric Co. will supply all electrical equipment. During the past five years it is said nearly 100 of these locomotives have been placed in service in the United States.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Cranes. The February-March issue, **Vol 1, No. 1**, of "Crane Service News," has made its appearance. It is folio size broadside of rotogravure pictures of mobile crane operations, published by the CRANE SERVICE ASSOCIATION, Lorain, Ohio.

Explosives. No. 1, Vol. 2, the January, 1931, issue of "Explosives Progress," a monthly publication. The issue features the use of explosives in blasting ice jams. INSTITUTE OF MAKERS OF EXPLOSIVES, 103 Park Ave., New York City.

Rotary Kilns. Bulletin describing the important features of Traylor rotary kilns, such as the self-contained single-roller support, which, it is claimed, makes an easy job of setting up and aligning the kiln shell, and the special fully-enclosed, dustproof and oil-tight speed reducer which eliminates the old-fashioned gear train. TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

Induction Motors. Induction motors for power plant auxiliaries is the subject of a new 8-page leaflet. This leaflet, **No. 20439**, lists the power plant auxiliaries usually driven by induction motors and gives the type of induction motor best suited for each. A large number of installation photographs are used to illustrate the leaflet. WESTINGHOUSE ELECTRIC AND MANUFACTURING CO., East Pittsburgh, Penn.

Cable Power Scraper. A new bulletin has been issued which describes and illustrates various parts of the equipment together with pictures of installations. A chart for the selection of the proper sized equipment with required horsepower is included. This is especially designed for the storage of bulk materials. ATLAS CONVEYOR CO., Philadelphia, Penn.

Perforated Plates for Vibrating Screens. Booklet on perforated plates for vibrating screens in double corrugated square and rectangular mesh. According to the manufacturer, this double corrugating prevents material from sliding over the plate at too fast a speed for good screening and at the same time rolls, tumbles and sifts the particles and also spreads them over the entire surface of the plate. HENDRICK MANUFACTURING CO., Carbondale, Penn.

Compressors. Bulletin **No. 102**, describing various types of compressors, and explaining the Pennsylvania method of "Dual Compressor Control," a method of regulation by which the compressor can be operated to take care of either the maximum or minimum demand (continuous operation for maximum demand and automatic stop and start for minimum demand), and which it is claimed results in lowered power consumption with a corresponding reduction in the cost of power and elimination of wear on the compressor during unloaded periods. PENNSYLVANIA PUMP AND COMPRESSOR CO., Easton, Penn.

Excavators. Bulletin **No. FBE-10301**, covering the new 1030 ¾-yd. **machine, convertible into** clamshell, lifting crane, shovel, dragline and drag shovel. According to the description this new machine is built to handle hard digging, and every moving part is designed for quick response, easy control and long life. Bulletin **No. B-521**, introducing the new 2¼-yd. 52-B Diesel shovel-dragline-clamshell-crane, new features of which include a six-cylinder, slow-speed, Atlas-Imperial, full-Diesel engine, improved steering, oversize mountings, arrangements for shipping without dismantling, etc. Illustrated. BUCYRUS-ERIE CO., South Milwaukee, Wis.

Handling Wire Rope. In "Wire Engineering" for March, 1931, **Vol. 1, No. 5**, there is a very pointed article on the right and wrong way to handle wire rope. Particular emphasis is placed upon the initial uncoiling from the maker's reel at point of installation. Many wire ropes are permanently damaged by kinking in the first unreeling. Reels should always be mounted on a mechanical device for unhindered rotation. JOHN A. ROEBLING'S SONS CO., Trenton, N. J.

Gyratory Crushers. Announcement is made by a circular that Bulletin **3100** on Bulldog gyratory crushers will be sent to those interested by TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

OWNERSHIP OF ROCK PRODUCTS

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of ROCK PRODUCTS, published every second Saturday at 542 South Dearborn street, Chicago, Ill., for April 1, 1931. State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared Nathan C. Rockwood, who, having been duly sworn according to law, deposes and says that he is the manager of ROCK PRODUCTS, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corp.; Editor, Nathan C. Rockwood; Managing Editor, None; Business Manager, Nathan C. Rockwood.

2. That the owner is Tradepress Publishing Corp., Chicago, Ill., and that the stockholders holding 1% or more of the total amount of stock are: W. D. Callender, Nathan C. Rockwood, both of 542 South Dearborn street, Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

NATHAN C. ROCKWOOD.
Business Manager.

Sworn to and subscribed before me this 7th day of April, 1931.

(SEAL) CHARLES O. NELSON.
(My commission expires May 27, 1934.)

DORRCO

This SAND has just been washed

. . . . but it is dry enough to handle easily

Riding up a belt with a 16° slope and traveling 270 ft. per minute, this sand is being carried to the storage bins in the Sterling Creek plant of the Eastern Rock Products Co., near Utica, N. Y.

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TRADEPRESS PUBLISHING CORPORATION

542 South Dearborn Street, Chicago, Illinois, U. S. A.

W. D. Callender, President; N. C. Rockwood, Vice-President; C. O. Nelson, Secretary

LONDON OFFICE: Dorland House, Mezzanine Floor, 14 Regent St., S.W. 1.

NATHAN C. ROCKWOOD, *Editor and Manager*
EDMUND SHAW, Los Angeles, Calif., *Contributing Editor*
EARL C. HARSH, WALTER B. LENHART, H. O. HAYES, *Associate Editors*
A. M. STERN, *Assistant Editor*
RALPH C. SULLIVAN, *Advertising Manager*
E. A. SINE, *Production Manager*

FRED S. PETERS, *Eastern Manager*
E. H. PAULL, *Eastern Representative*
280 Madison Ave., New York City. Tel. Caledonia 5-4474
GEORGE M. EARNSHAW, *Central Advertising Manager*
1374 West Blvd., Cleveland, Ohio. Tel. Woodbine 8031
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